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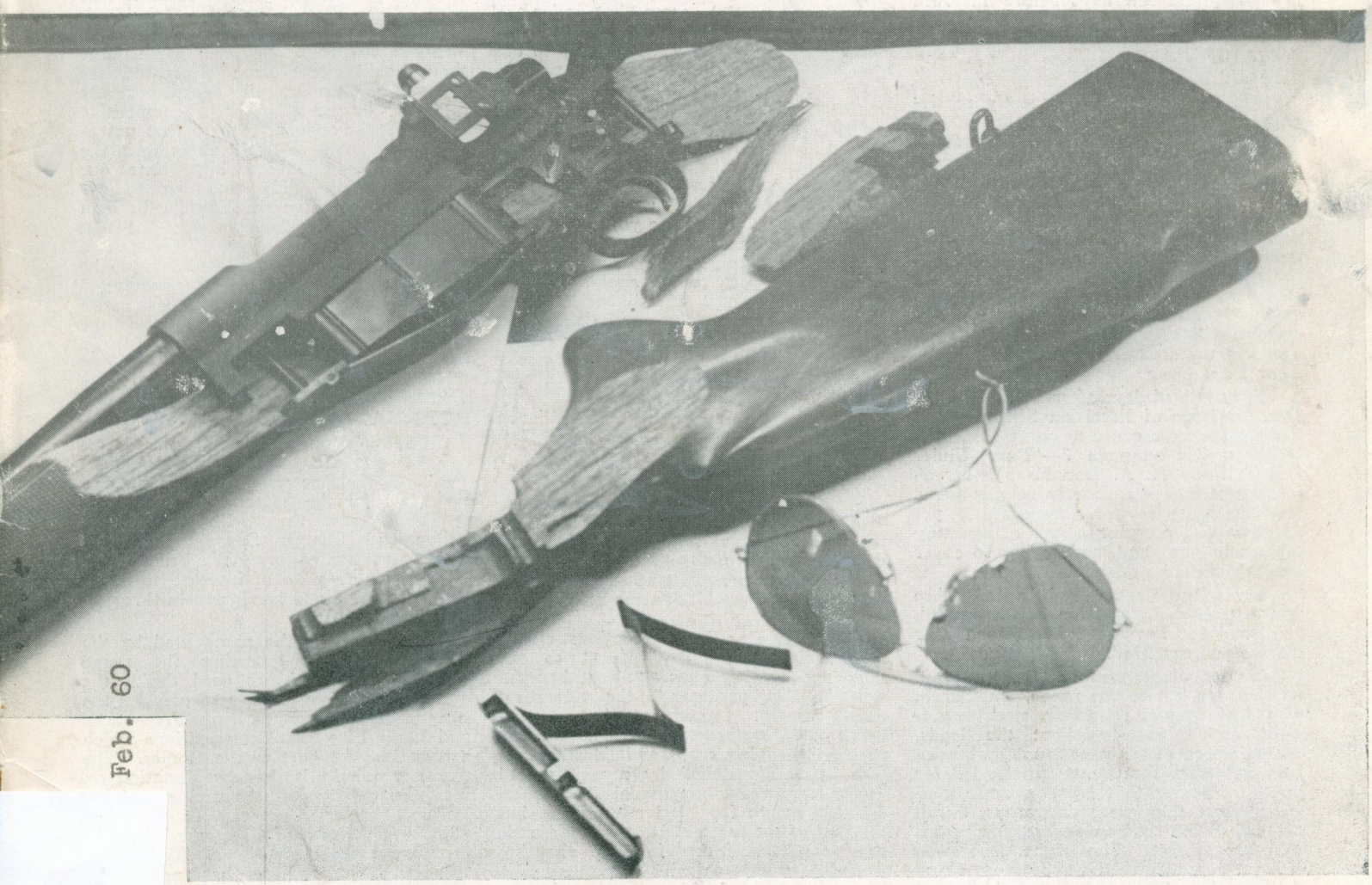

Feb. 60

A "WHAT NOT TO DO" HANDLOADING RESULT
(See story on page 2)

THIS MONTH

THE WAUKEGAN INTERNATIONAL SHOOTING ASSOCIATION
BARREL VIBRATION
HARVEY DONALDSON WRITES
ARE FEATHERWEIGHT RIFLES "LOAD SENSITIVE"?
LETTERS
BEGINNERS CORNER

a magazine for Shooters by Shooters

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BOB OWEN

Bob Owen, one of the country's finest custom gunstock makers, died at his home in Port Clinton, Ohio, in early December, just a few days before his 75th birthday.

A HANDLOADING "WHAT NOT TO DO"

(Editor's note: We recently received the photo on the cover and the following letter from Harry E. Jenkinson, P. O. Box 1251, Muncie, Indiana. Mr. Jenkinson is a rifleman and firearms hobbyist of over 50 years experience, part of that time in the U. S. Army from which he was retired as an Ordnance Master Sergent in 1944. He writes, "I have spent the most of my time since then on the rifle range and with my loading press and powder scales." The editor met and enjoyed chats with Mr. Jenkinson at Camp Perry several years ago.)

Dear Phil:

A couple of days after I received the Dec. '59 issue of Precision Shooting and had read it from cover to cover (especially the article on page 3—"Burr Under His Tail" by H. A. Donaldson), I was visiting one of my shooter friends when in walks Dave Scott, a young lad not yet 20 years old, carrying a pair of shooting glasses in one hand, and trying to cover his face with the other.

My friend, Jesse Sarah, asked, "Are you hurt Dave?", and the boy answered, "Not bad but I'm afraid I've ruined your glasses and my Mod. 70" (.30-06 cal.).

Dave had stopped by Sarah's place on the way out to the range, and Sarah, who does custom reloading, strongly advised the lad not to shoot the loads, which were of the commonly known "duplex" type, that Scott had loaded for himself. Seeing that he could not convince Scott they were dangerous, Sarah did talk Scott into wearing his B&L shooting glasses. The right lens was cracked and chipped in two places along the lens rim. The glasses probably saved the lad's eyesight, at least in the right eye. He will probably carry a few small scars for some time to remind him of his experience. The enclosed picture (on the cover) will give an idea of experimentation going a little too far.

A part of the head of the case blew back past the bolt and lodged on the left side at the bridge, so tight the bolt was locked. The extractor blew out at the bolt face, but was held by its ring around the bolt. The follower and the spring blew out of the hinged floor plate and the floor plate bent from the pressure.

Dave told me he blames no one but himself and has learned a lesson.

I believe the load (or something similar) was taken from a magazine article written by one of the editors that Donaldson mentioned in his page 3 article in your magazine. I will add here, I do not agree with Donaldson that **all** shooting magazine writers are inexperienced on the subject they write about, but one out of fifty is entirely too many when gun powder is involved, as the picture clearly shows.

We cannot be sure where the lad got the idea of mixing powders as he did, but it can go on record that I personally would never load like that and I am sure Sarah wouldn't.

I've tried to stress to the younger generation (I have loaded some types of ammo for nearly 50 years) that the reloading manuals serve only as a guide, and that since each rifle is a law unto itself, an accurate load in one isn't necessarily accurate in another, and much more important, a mild load in one rifle may be maximum in another, considering tightness of the chamber, bore, groove diameter, etc.

I don't want to seem "hot under the collar." but am burned up over some of the stuff I've read in years past up to the present. Maybe if there was a way to hold some of these writers responsible for damages they would hesitate writing certain things—at least they might go out and get themselves some practical experience under their belts instead of copying ballistic figures off a chart that gun manufacturers engineers figure out on their slide rules (or what have you).

We are not wanting publicity in any sense. We merely want to show and tell what can happen when excessive pressures are built up. If this unfortunate accident that happened to Dave Scott will serve as a warning to some of our Handloader Friends, then we will feel our mission is accomplished.

Sincerely,

Harry E. Jenkinson

SUGGESTION TO ARMS MANUFACTURERS

Jim Scoville
Osage City, Kansas

Every now and then I feel like I must let off steam, so I'll start off the New Year with a blast at our collective whipping boy, the U. S. arms manufacturers.

With two or three exceptions, all .22 rimfire rifles are today offered to the public as hunting guns. "Shoot harmful pests," "Kill predators" the advertisements scream. Crows, rats, bobcats and other predatory beasts are depicted in the act of destroying crops and livestock before being dispatched by a well placed bullet from the latest model .22 plinker. All this makes for good advertising, but the fact of the matter is that there is precious little of this sort of shooting available to the majority of gun owners. Hunting, any kind of hunting, is today increasingly expensive and restricted, and in many places you just can't hunt at all unless you own some hunting land, or are a good friend or relative of someone who does. Farmers, ranchers and rural landowners generally are becoming very hard-nosed about unauthorized shooting on or near their land, and they certainly have every right to take such an attitude. All of which points out the fact that those people who are interested in guns and want to shoot them, must do so on some suitable target range. This applies particularly to junior shooters, and the large number of individuals and clubs enrolled in the NRA junior shooting programs attests to this fact. The day of free hunting for everyone is gone, and whether we like it or not, most of our youngsters today will have to learn to use firearms on the target range rather than the game field.

With competitive target shooting fast becoming the dominant shooting sport in America, why do our firearms manufacturers persist in marketing rifles that can have a practical value to only a minority of shooters? Sure, I know all about "Consumer demand" etc., but I also know that advertising **creates** demand as the automobile industry has shown. Although I can't prove it, I believe there are a lot of hunting and shooting accidents caused by people who go out to shoot varmints and pests "like it shows in the gun ads." Another example are the advertisements that urge "take your boy hunting" or words to that effect. Frequently "Dad" doesn't know any more about gun handling than junior, and it's a case of the blind leading the blind, sometimes with regretable results.

The point I'm trying to make is that our arms makers should direct their advertising into more realistic and constructive channels. At the same time they should direct some effort towards marketing a simple, reliable and accurate .22 junior target rifle at a competitive price. There appears to be a vast potential for all forms of target shooting in the United States, and it's high time our Arms companies did something to encourage competitive shooting for its own sake. Ample proof exists for the fact that serious target shooters are, as a group, the safest gun handlers to be found. If more people were encouraged to enter competitive shooting, the entire nation would benefit. Let's hope the Arms companies will see the light.

THE WAUKEGAN INTERNATIONAL SHOOTING ASSOCIATION

(Editor's note: The following is reprinted from **THE CLEANING PATCH**, the fine monthly news bulletin published by the Wisconsin State Rifle & Pistol Association, with J. R. Olson editor and Chester Snavely and Ron Hinz, associate editors. We believe this information may be of interest to many target riflemen and handgunners throughout the nation.)

The above is the name used by the organization now operating the range and club house facilities used during the 3rd Pan-American Games to conduct the Free Rifle, Small Bore Rifle, Free Pistol and Rapid Fire Pistol competitions which are an integral part of the Games. The range was built largely by donation on land donated by Johns-Manville and the Public Service Company of Northern Illinois at the foot of Greenwood Avenue, in the northeast section of Waukegan, Illinois. The property has now been deeded to Waukegan by these two organizations, so the entire shooting facility is owned by the city.

The layout of the property might best be visualized by imagining the planform as a large letter U, with the open part facing the west and separated from the ample parking facilities by a high concrete block wall. Entrance is at the south end of this wall. Immediately to the east of this wall is the area devoted to the running deer range, which in turn is separated from the pistol range by another wall. This area is inoperative at this time, inasmuch as all the equipment was the property of the U. S. Army AMU and was returned to Fort Benning at the close of the Games. Firing in this bay as

well as the rapid fire pistol range immediately to the east, is in a northerly direction against a high dirt and rubbish bank. At the east end of this area is another concrete block wall to prevent stray shots from entering the free rifle and pistol enclosure. The six bays of three swiveling rapid fire silhouette targets are still in place, and with the assembly area immediately to the south, make possible pistol competition up to 50 yards.

Along the entire south side of the property is the club house, the north half being an assembly room, now well stocked with chairs, sofas, tables, etc. Inasmuch as the entire north wall is a series of picture windows, the entire silhouette pistol range is in full view of any part of the club room. The south half of the building is walled off and consists of wash rooms, stock rooms, and statistcial office. At the east end is a small restaurant.

Along the base of the U, and extending for the full width of the prpoerty, is the main range which consists of a building about 250 feet long and about 25 feet deep, solidly enclosed on all but the east or shooting side. The house is equipped with a concrete floor, the entire area being separated by a roped off spectator section and a shooting section, the latter being an addition, partitioned off so that each group of two shooters are in a separate bay 10 feet wide. The front of each shooting position has a Dutch door, the upper portion being a single glass pane. Both sections swing outwardly against stops. Each position is equipped with its own overhead light and buzzer to the pits.

Firing can be done at 50 meters, 100 meters and 300 meters from the same position. Rugs, cocoa mats and sand bags are furnished, for use on each point and also portable heaters during cold weather.

Because of the temporary lack of access to the pits other than directly in the line of fire, firing is done in 20 minute periods, after which firing ceases and all those who wish can go forward to examine their targets. This situation will be eliminated very shortly by the completion of a tunnel, the full length of the range, which will permit safe access to the individual pits while firing is in progress.

The pits consist of 40 double sliding targets at each distance with additional facilities at 200 yards already partially completed. The targets are fastened to heavy solid fiber-board with staplers furnished by the range (you furnish or buy your own targets). The fiber-board in turn, is permanently attached to the wood frames of the sliding targets.

The range, for safety reasons, is apportioned as follows: 15 targets at the north end for 50 meters, 15 targets at the center section for 100 meters, and the balance at the south end for 300 meters.

This shooting plan is presently under the capable direction of Ex-Sgt. James L. Wade. lately of the Army, who is operating it from 9 A. M. local time until sundown 364 days of the year (the range is closed Christmas day). Inquiries should be directed to Box 256, Waukegan, Illinois. Shooting is by daily fee, $1.25; yearly individual membership of $12.50; or family yearly rate of $17.50.

Matches are contemplated during the spring and summer to be conducted by the association, but the range will not be available to groups for exclusive use.

Inasmuch as the range is about equal distance from Chicago and Milwaukee, it is hoped that shooters from southeastern Wisconsin as well as those from north eastern Illinois will avail themselves of these splendid facilities.

As a last point:—the writer **is not** in the hire of this organization, even though the above may sound like a release from a public relations office. He, like a number of others who plunked down $12.50 (of which $2.50 is for insurance), became charter members because we did not want this place to become a park, and we felt that such a range was a real necessity for this area, where firing could be conducted safely and uninterrupted by planes, boats and military regulations. We hope that the other shooters in the area will look at it the same way, in which case we can all have a place to practice and compete.

BARREL VIBRATION

By Creighton Audette

In the September, 1959 issue of Precision Shooting, Jesse M. Grigg wrote an article titled "Dynamics of the Bolt Action Rifle." This was an excellent analysis of the bending of a rifle barrel and action under the forces of barrel whip and recoil, and of the resultant "creep" of the action in the bedding. Mr. Grigg stated that it was his "inexorable belief that the motion of a barrel while the bullet is in the bore is whip, not vibration."

A short time later, while doing some research in some of the earlier issues of The American Rifleman, I noticed a reference to an article on the subject of barrel whip by Harry Pope in the magazine Arms and the Man, which was the predecessor of the Rifleman. A request to the Rifleman resulted in the receipt of a photostat of the Pope article and it is reproduced herewith. It is most interesting to note some of the similarities of the article by Pope and that by Grigg, so far as the subject of barrel whip is concerned. Both of them give the same explanation of the reason for their belief that there cannot be vibration of the barrel until after the bullet has left the muzzle.

The British Textbook of Small Arms, edition of 1929, also goes into the question of barrel whip and barrel vibration at some length. The authors seem firm in the belief that "there are two types of transverse vibration which can be set up; (1) a fundamental vibration, in which the whole length of the barrel vibrates as a single unit, there being only one node or point at which the barrel is still, the point at which it is fixed (the breech); (2) a series of overtones in which the barrel is divided longitudinally into a number of vibrating sections, each terminating in a node at the end nearer the breech. These two types of vibration can, and usually do, co-exist. The frequency of the fundamental vibration depends on the proportions of the barrel, and that of each particular overtone is always in a fixed ratio to that of the fundamental." The many factors affecting barrel whip and vibration are discussed at some length in this book and interested readers are referred to it for a full explanation. It describes "positvie" whip as upwards and "negative" whip as downwards. In the case of positive whip the front sight will be higher than a line drawn through the rear sight parallel to the bore. With negative whip the front sight must be lower than this line. To quote again—"In the S. M. L. E. with Mark VII ammunition, it will be found to be between 4 and 5 minutes negative. With the same rifle and Mark VI ammunition, it is about 7 minutes, and positive. An obvious instance of positive jump may be seen in many revolvers, which have their foresights noticeably higher than their backsights." MK VII ammunition used a 174 grain, pointed bullet at 2440 feet per second and MK VI used a 215 grain, round nose bullet at 1970 feet per second.

Now the Pope and Grigg explanations both show very clearly the phenomenon of negatvie whip and the reasons, but to my mind, they offer no explanation of positive whip. To take the case of the S. M. L. E. given above; the slower and heavier bullet strikes 9 minutes higher than the faster and lighter bullet. There must be little difference in the recoil of the two loads and the longer time in which the gun is recoiling with the slower load does not seem to be sufficient explanation for the difference in the points of impact. If it is assumed that the barrel has moved back from its initial downward whip and has gone upward past a straight line of bore, is this not vibration? Also, if it is assumed that there is secondary vibration (that overtones do exist in the barrel during bullet passage) then the upward or downward inclination of the last vibrational node at the muzzle would explain the difference in points of impact.

The weight, dimensions, and contour of the barrel would seem to be the greatest factors involved in differences in barrel vibration. The S. M. L. E. has a very light, whippy barrel, in fact the lightest barrel of any of the military rifles. I believe that the Ross match rifles also exhibited positive whip characteristics and that these had long, slender barrels. I cannot think of any American military or production rifle which has the positive whip characteristic, but our rifles have heavier and stiffer barrels.

Probably the positive whip of revolvers is explained by their relatively short and stiff barrels, the relationship of the applied force, or rather the point of application of the force of recoil, and the point of resistance and the type of resistance offered by the hand as it grips the revolver.

There is no question as to the existence of barrel whip and its causes and at least some of its effects were proven by Metford in the 1860's. Ever since then shooters have been arguing and conjecturing about barrel vibration. With the measuring and recording equipment and the high speed movie equipment available today it is high time that someone made a thorough and scientific test of the matter.

CREDIT ACKNOWLEDGEMENT

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MAINE STATE GALLERY PISTOL TOURNAMENT

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ARMS AND THE MAN

FORMERLY
SHOOTING AND FISHING.

VOLUME LV. No. 23. WASHINGTON, D. C., MARCH 5, 1914. $3 a year. 10 cents a copy.

The Real Movements of a Rifle in Firing.

By H. M. Pope.

I HAVE read with interest the various articles by Mr. Evans, Dr. L. and Exc., in ARMS AND THE MAN of December 25, January 13, February 5 and February 12, on "Resting a Rifle," and have been trying to send you this reply for weeks but have been unable to get to it.

We all agree as to facts stated, so I will confine myself to the reasons for the facts they give. I am going to criticise, although I consider them friends of mine, Mr. Evans especially so. Their theories are not borne out by the facts, and I shall have to put myself in opposition to them. Exc. is nearest correct, however.

The disturbing influence is the recoil and not the "sag" or "vibration" of the barrel. The direction in which the recoil influences the shooting is governed by the various resistances which include that of the shoulder, and the position of the weight and the supports.

The action of the recoil is *straight back* in line with the barrel, but the resistance is always below the line of the barrel; that is, the center of gravity of the rifle, also the resistance of the shoulder. This low resistance causes the whole gun to try to revolve around the center of resistance, precisely as pressure on the crank of a bicycle wheel tends to revolve the wheel.

This sudden pressure bends the gun into a curve, with the center below the barrel, and causes the muzzle to dip and the breech to rise out of the line and shoot low.

Different points of rest or resistance or the softness or hardness of the rest only modify this fact, each and every one shoot low, but to a varying degree.

In Mr. Evans' first article he quotes me as saying "that a barrel shoots its proper elevation, when shot from a rest."

He is wrong. What I said was: that a barrel shot from a rest *with a concentric action, in which the center of gravity of the gun was the center line of the barrel,* shot at its proper elevation;" hence there is no bending strain, the barrel drives straight back and there is no buckle.

Mr. Evans says, "I don't believe in buckle a little bit." You notice in the foregoing I have said the *gun* bends. Now let Mr. Evans take his rifle and put the barrel into a good, strong, solid vise; take hold of the stock and push it down or up. He will find no difficulty whatever in moving the butt plate down and up a half inch or more; he may also notice that the take-down joint moves a little; besides this, there is some little bend in the barrel—not so much, perhaps, in this experiment as in shooting, because the power applied is less, but it is there.

I rifled Mr. Evans' barrel, shot a similar action to his and spent five years in the factory where it was made, so when I say the above are facts I know what I am talking about.

These movements in joint between stock and action and between barrel and action (take-down) are in reality hinges which allow of movements at these places; they also are a serious detriment to fine shooting, as various conditions of tightness greatly affect the elevations in shooting; they are always present in a greater or less degree.

To shoot finely, a stock must always be kept as tight to the barrel and action as possible. If we wish to observe results that are difficult to watch, we would reason that if we made an experiment with exactly the same conditions, but in an exaggerated form, we could the easier arrive at a correct conclusion; so, long ago, I made the following experiment.

I apologize to Exc. for the similarity of it to his, but show it because it goes further, and was done by myself, as I said, long ago. The apparatus was reproduced again at the time of Mr. Evans' first article.

Following this reasoning, see Fig. 1. Here "a" and "b" represent a flat surface, a bench or floor will do; "c" is a steel rod ⅜ in. by 6 ft.; this represents the barrel; "d" is the stock—a piece of wood 2 in. square and 14 in. long, with a ⅜ in. hole in one end and the other end hinged 6 in. below the rod by a wire nail at "y" to the shoulder "e" which in the experiment is a block of wood upon the bench; if this is not heavy enough to hold the barrel (rod) in position, a weight may be placed upon it; "g" is the palm rest, a piece of inch square wood, with a ⅜ in. hole and driven tight onto the barrel, as is also the stock "d"; "j" is the muzzle rest left out of position on the first experiment; "h" is a cotton swab, daubed with ink or paint; "x" is a wooden block about ½ in. below the swab (muzzle); "l" is a clean sheet of paper laid upon the block.

Now we are ready for our experiment, the muzzle rest "j" is not used; take hold of the top of the stock at the barrel "z" and give it a sharp pull backward in line with the arrow, that is in line with the barrel; you will see the whole barrel bend into a sharper curve, the breech will rise, the muzzle will go down and the ink swab will leave its mark on the paper. If the foregoing dimensions are followed

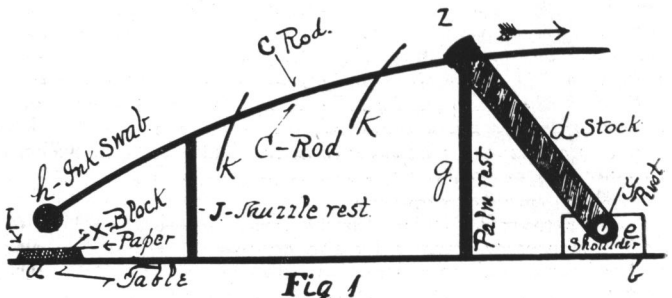


Fig 1

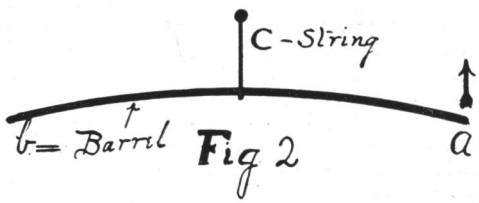


Fig 2

you will have no great difficulty in making the muzzle go down two inches.

Now, while the pull (recoil) was straight back, we readily see that, as the resistance of the shoulder "e" at "y" was so much below the barrel, the barrel could not come straight back, but was forced to describe a curve around the center of resistance "e," shown by curved lines "kk" drawn about the center "y." This gives the gun a violent upward blow at its rear end, lifting the same.

Lifting the rear end of the rifle barrel, we all know, will lower the shot; this buckle or lifting of the rear end, or the humping up of the middle of the whole rifle (barrel, action and stock) is the explanation of nearly the whole of the depression of the shot at the target.

It is so simple an affair that it has been overlooked, and it is not the "sag" of the barrel itself, which Mr. Evans says it is.

Besides the main error above stated, there is a flip or depression of the muzzle, fully illustrated by the accompanying diagrams, which adds to the above error and makes the large depression at 100 yards, about which so many articles have been written.

The barrel is first lifted at the breech; then, as the strain is increased, the whole barrel is lifted around the center "y", though the first

impulse of the muzzle "h" was to go down. The reason the muzzle first goes down is shown by experiment Fig. 2.

Here we suspend the barrel by a string at its center of gravity where it will balance. If we strike the breech "a" up in the direction of the arrow, the whole bar will turn at its center of gravity and the muzzle will dip. In Fig. 1 we had a violent blow upward, caused by the recoil, because the resistance was below. A bar under strain bends a certain amount under that strain and a greater amount under more, consequently the upward blow or buckle first dropped the muzzle, because the strain was not enough to lift it, then as the strain increased, lifted it.

Now let us take the experiment Fig. 1, except this time we will use the muzzle rest "j", placing it close to the muzzle.

Now, when we fire the imitation gun again with a quick pull, the muzzle does not dip, because the *hard rest* will not allow it to dip, but if the rest were soft *it* would yield under the downward pressure somewhat, and the muzzle would dip down more.

The above experiments give us the following results. With no muzzle rest the recoil dips the muzzle, as well as bending the whole gun upward at its center; this gives us a very low shot. With the hard rest close to the muzzle, the muzzle is prevented from dipping, although the gun is bent upward nearly the same, and we have a much higher shot than with the rest back from the muzzle.

With the soft muzzle rest or one some way back from the muzzle, the muzzle dips some besides the bend or buckle in the gun, and we have a shot between the other two in elevation.

These facts are borne out by shooting under proper conditions and I consider them unanswerable.

"Sag"? But you will say as you observe the above experiments, "the barrel sags." Of course it does some, but with an average barrel the amount is so small that it accounts for but very little indeed of the difference in shooting.

Here are some measurements carefully made by myself (and, without being egotistical, it is sometimes acknowledged that I know how to make measurements of rifle barrels):

First a 32 in. No. 4 round barrel (1 and ⅛ in. diameter) was rested on two supports on a solid planer bed, 30 in. apart; a 16 lb. block of steel was placed on the barrel at its center and bent the barrel down .003 in., just the thickness of the paper ARMS AND THE MAN is printed on. This is practically nothing, so far as the shooting goes.

Next, the barrel was held rigidly at its breech so that 28 in. of it hung outside its support or practically the same length that would be outside the palm rest of a Schuetzen barrel. The average of a number of measurements showed a droop or sag of .015 in., *and but one-tenth this amount out of a straight line.*

I am quite sure that in this case the support yielded a trifle, but was unable with the apparatus at hand to determine how much; certainly the droop was less, rather than more, than this amount. Well, what does this amount to, if at a 100-yard range (or 129 times the length of the barrel) 1.93 in.? Comparatively little, when I tell you that the actual drop of the bullet in my .33-cal. Schuetzen rifle, with a very light stock and aluminum butt plate, is close to 7 in. difference when shot from a concentric action or my 4-lb. stock and action.

But notice, the front sight is also on this barrel and droops with the muzzle to practically the same amount, so when shooting with the barrel free, you really hold the muzzle higher by the amount of the droop, so the error from the droop is practically corrected, for you really aim higher in the off-hand position than on the muzzle rest, yet the barrel shoots *lower*. Why? Because the gun (barrel, action and stock) bends or buckles upward and the muzzle dips downward and the shot goes low,—no other reason.

"Vibration"? Just *rot*. (See article by Dr. L., ARMS AND THE MAN, January 1.)

Put one end of a steel rod into a vise, pull it to one side and hold it. Does it vibrate? No. Why Not? It is under a strain and cannot. Let go of it and it immediately begins to vibrate, because the strain is released and the rod is free to vibrate as it pleases.

The recoil of a rifle is the strain, and it does not cease until the bullet leaves the muzzle; then the strain being released and the barrel free, it commences to vibrate; the bend is not a vibration, but the cause of it. A barrel shot with a concentric action does not vibrate at all, it simply slides back under the finger without a tremor. The recoil is there, however, just the same and, according to Dr. L. and Exc., the vibration should be there, but it is not. You can take my word for it, also you can read Dr. Mann's book and see.

The V rest and concentric action are too expensive for most shooters, but if you wish to experiment you can approximate these results by using two wood blocks on a plank and shooting with your action on only, then with the stock and butt plate on. You will find the difference very pronounced, though the bend and vibration afterward are there in both cases.

MR. EVANS' VERIFICATION TEST.

Mr. Evans can sight a rifle off-hand (I don't want him to use my eye for a target, if the sighting suited him), but when he takes his rifle to the rest and puts the butt on a wedge I am doubtful. He don't say which way the wedge inclines, and as the gun moves backwards somewhat before the bullet leaves the muzzle, the inclination of the wedge would make some difference.

When he shoots with the front brace further back he of course gets lower shots, as the muzzle has a chance to go down (flip), but not near as much as if it were entirely free of support.

Why did his rock hung on the barrel (supposedly it was in the middle, but he does not say) make it shoot higher? Because it made the barrel sag more? Not much, but simply because the power of recoil being the same, it could not lift the increased weight as high as before, there was less buckle, and so the muzzle pointed higher and the shot went high.

Exc.'s theory of vibration of the barrel, by which I understand he means expansion and contraction of the diameter of the barrel, I do not accept. It is true, there is theoretically an enlargement of the barrel when subjected to inside pressure, but it is so very small that it cannot account for any displacement of the gun on a rest, to produce any such results as are under discussion; you have got to have substantial movements, not infinitesimal ones.

If the outside of the barrel were so moved, the inside would be subjected to strain much larger than the elastic limit of the metal, and you would have a ringed barrel.

Lead, as we know, is not an elastic metal; cast a collar of it onto the outside of your barrel and then fire it. If the barrel enlarged in its diameter the collar would also enlarge and remain set and be loose on the barrel, but it isn't, and therefore this is a proof that the barrel does not increase in size under the strain.

In shooting from the right shoulder, the recoil of a rifle is upward and to the right; if from the left shoulder, upward and to the left; that is, the gun pushes the man back on the side he shoots from and turns the gun in the same direction. Now, if the right-handed man rests his left hand lightly against the right side of a tree and holds his gun in the same place he does off-hand, the recoil will turn the gun away from the tree and the shooting will be normal; if he rests it against the left side the recoil will throw the gun against the tree and the shot will be wild. The converse of this holds for a left-handed shooter.

Dr. Mann will soon have something to say on the subject we are discussing based on and proved by our actual shooting. I consider the proofs absolute and unanswerable, and think it will be well if readers will withhold their judgment until they have a chance to read his article describing our experiments at his range.

THE GENERAL AND THE DEER.

THE General referred to is our old sportsman friend, Oscar C. Guessaz, of Texas, Brigadier General, Retired, of the National Guard of his State, and readers will kindly note that the "deer" is spelled d-e-e-r.

In a late issue of his excellent magazine, *Texas Field*, General Guessaz tells in his own inimitable manner of incidents transpiring on what he calls his "fourth annual hunt." We extract from this interesting article only so much as has to do with his own personal shooting experiences during the trip.

"As I slipped along the edge of the brush,—for be it known to the uninitiated that, 'the wise and astute still hunter follows the tactics of the game itself,' in that he will nearly always be under cover himself, and he seldom walks out in the open, it being a principle with him and the foxy buck too, to never expose oneself unnecessarily—I had a pair of horns with which I intended to test the 'rattling' matter once more, having been successful last year with them on the occasion of my hunt with 'single-shot Jones.'

"So on reaching a bunch of black brush in the center of a clearing I gave the horns an ominous clash and tried to imitate the noise that two bucks make when engaged in mortal combat.

"At about the third rattle, I noticed a small deer approach swiftly and silently, and it stood at about fifty yards, looking intently in my direction. As I put the field glasses to my eyes, I discerned little horns about two inches long, and concluded that it was a good piece of seasonable venison, and reached for my rifle.

"Alas, for that moment! And alack for the deer, for he disappeared as if the earth had swallowed him. I found, upon examination of the terrain that a few feet from where the little buck had stood there was

BULLETS—POWDERS—CARTRIDGES

By F. L. Magoon
Box 909
Kerrville, Texas

We have recently observed the behavior of some bullets, both on the target and game. We have been loading the 6 m/m X 270 with 100 grain soft point spitzer bullets ahead of 56 grains of 4831 powder. According to some chronograph data I have on this caliber, the velocity should be a little over 3300 F. P. S. When checking the rifle for accuracy and using targets printed on a high grade hard finish paper, about three out of five would group within about one inch and the bullet holes were clean and sharp. The other bullets would go out of the group as much as two inches and make a ragged hole of about .35 caliber. Apparently the soft points of the bullets were melting during the 100 yard flight to the target. Another load which was a case full of .50 caliber machine gun powder behind 110 grain round nose soft point bullets, had the same point of impact at 100 yards and the groups were within one and one-half inches. The bullet holes with this load were all clean and sharp.

A deer was shot with the 100 grain spitzer load and hit in the center of the neck about midway between head and shoulder. The hit was at such an angle that the bullet traveled about 18" inside the deer and the remains of the bullet was found just under the hide on the opposite side of the rib cage near the diaphragm. The remains of the bullet weighed 43 grains. The deer was killed instantly. Another deer was shot with the load using the 110 grain round nose bullet with a case full of the .50 caliber machine gun powder. This deer was standing broadside and was hit about center of the rib cage. The bullet apparently did not expand but went through the deer leaving a small exit hole. The deer ran about 50 yards and fell dead.

Our next experiments with the 6 m/m X 270 will be with 112 grain hollow points.

We have also been experimenting with the .264 Winchester caliber. The data shown in the loading manual on this caliber does not indicate that it is worth having. We have a .264 rifle on an Enfield action with a Douglas barrel rifled one turn in nine inches. The rifle is equipped with an 8 power Hensoldt scope, which incidentally is a fine piece of optical equipment. When testing the rifle on the target with a load of 80 grains of .50 caliber machine gun powder behind a 140 grain spitzer soft point bullet the results were about the same as with the 6 m/m X270. About three out of five bullets would form a nice group and the others would go out of the group as much as two inches and make ragged holes in the target with some as large as .50 caliber. A deer was shot with this rifle and hit in the rib cage about two inches ahead of the diaphragm with the bullet ranging forward and making a one inch exit hole near the shoulder on the opposite side. This deer when hit seemed to go into the air and make a back flip. It landed on its back and stayed there. When the deer was opened up the contents of the chest cavity was found to be blown to a pulp. The diaphragm was in shreds and the contents of abdominal cavity were somewhat mangled. We do not know what the velocity of the load we are using is, but indications are that it is better than the best loads shown in the loading manual.

One of my friends went to Montana on a hunting trip this fall and while he was there he contacted a rifle enthusiast who has a .22-270 rifle for which some great claims are made. He came back and asked me to make a .22-270 for him. Another friend of mine heard of this and now I am in the process of making two rifles that will use .224 bullets in the .270 case. I am waiting for the reamers at present. The taper of the body of the .270 case will not be changed but the shoulder will be 30 degrees. We will have three weights of bullets to use in testing; 87 grain hollow points, 90 grain spitzer soft points and 95 grain hollow points. The barrels we will use will be rifled one turn in eight inches. I have one of the barrels now. I am of the opinion that such a rifle as the .22-270 would not be worth much with any powder other than the .50 caliber machine gun. The rifle with the heavy bullets should be about the ultimate for long range shooting. The powder charge will probably be about 68 grains of 5010. The velocity should be somewhere in the 3500 F. S. range.

The question that immediately arises when a cartridge such as the .22-270 comes to mind is how about barrel life. No doubt such a cartridge when used with conventional powders and such bullets as could be practically used with them, the barrel life would be very short. With the extremely slow burning powder the situation is drastically changed.

I have a barrel now that has had nearly 3000 rounds through it from a Roberts case with 52 grains of 50 caliber machine gun powder behind 87 grain .224 bullets. The barrel shows no signs of erosion or wear and was very accurate when removed from the rifle. One of my friends who is getting the .22-270 has a 6 m/m Magnum, which is the Magnum case blown out to maximum capacity. The load used is 88 to 90 grains of 5010 powder behind the 105 grain bullets. He tells me that after several hundred rounds there is no visible barrel erosion or wear. He says that the accuracy which is excellent for a caliber of this class is unimpared. I understand that this caliber with the loads shown above has been chronographed with an average velocity for ten rounds of 3750 F. P. S.

In view of the evidence I have had before me to date I do not hesitate to make a rifle that is considered as being far over-bore capacity when the very slow burning powders are used.

All that I have written this far has little bearing on bench rest shooting except that there might be new possibilities to explore in cartridges using bullets of higher sectional density for the 200 and 300 yard ranges. The .22-257 which I had would stand up well today in the light varmint competition at 100 yards and under bad wind conditions would give an excellent account of itself at 200 and 300 yards.

Mr. Hufnail who advertises in Precision Shooting sent me some sample .224 bullets in 87 and 95 grain weights. His bullets show excellent workmanship. We ordered some 112 grain 6 m/m bullets and 500 of the 95 grain .224 bullets. I believe that these will be just what we need for the .22-270.

When you may be writing to our advertisers please mention that you saw their ad in Precision SHOOTING. They will appreciate it and so will we.

COOPERATIVE TESTING COMMENT

Edward M. Yard

Re: TENTATIVE ANSWERS TO INACCURACY PROBLEMS

1) "Does the change in room temperature bring about a change in weight value in your scales?"

Answer: If we consider the Redding scale, and if we take 75 degrees F as standard, then at 90 degrees F, weighing a charge of 50 grains there would be an error of .02 grains due to unequal beam lengths. If the scale were set for the 50 grain charge, the actual load would be light this amount. At 60 degrees F, it would be heavy.

Comment: Sometime ago I compared a popular scale (Redding) with actual weights from a laboraotry balance between 1.0 and 50.0 grains. The charge was first weighed on the popular scale as closely as possible, then transferred to the analytical balance and reweighed to 0.1 milligrams. Beyond 4.0 grains the largest error was 0.8%. At low weights sensitivity is the limiting factor. Above 20 grains the largest error was 0.3%.

2) "Primer strength/effect upon velocity and accuracy?"

Answer: I have done some work on this for pistol loads. All loads were assembled at the test range so that every possible variable could be eliminated and instant re-tests made if indicated. All charges came from the same lot of powder, all new cases from the same box, bullets came cast batch, everything weighed and loaded with no chance for a change of settings. Each make and batch of primers gave different results. As much as 100 fps difference in velocity averages for different primers have been observed several times in a load going about 1300 fps.

Comment: Primers not stored in sealed containers over a disiecant (Drying agent) produce terrifying velocity variations when subjected to chronograph test. In rifle loads, similar variations have been found. Unless primer performance is under complete control, there is no point in worrying about that powder scale temperature variation.

3) "You refer to John P. Neissel's article in the AMERICAN RIFLEMAN and the results he reports when bullet seating depth is varied." His finding that muzzle velocity is decreased as bullets were seated deeper, decreasing powder space, should not be taken as a general conclusion. This determination represents a special case. Some loads will be found which will behave this way, also some loads will show a decrease in velocity, or no gain, when the charge weight is increased, but the general case is that the reverse is true. These reverse acting loads are ones where the case is pretty well filled.

His report that the velocity of a fouling shot fired from a clean cold barrel is considerably low from some guns is curious. In chronographing a few dozen rifles, this has never happened in my work. It has never occurred with a revolver in my work. Perhaps some unnoticed factor in his tests accounts for this. There should be no basic reason for it, and certainly it should not be expected to occur generally. I have done enough chronographing to say that you could expect this to be unusual.

(These answers and comments were from Edward M. Yard, who is employed as a Mechanical Engineer. He provides chronographing service in his spare time.

His address is 110 Kensington Avenue, Trenton, New Jersey. Mr. Yard is a member of the Cooperative Testing Group which has recently banded together to find facts that lead to, or deter from, accuracy.)

HARVEY DONALDSON WRITES (THE ORIGIN OF THE 25/20 S. S. CARTRIDGE)

Dear Phil:

In looking through my files recently I came across data taken from some old copies of the AMERICAN FIELD of 1884, which has to do with the early experimenting of F. J. Rabbeth, the shooter who originated the 25/20 single shot cartridge.As Mr. Rabbeth was the first shooter to ever order a barrel made in 25 caliber, I thought some of this data from my files would be of interest to your readers.

His first experimenting was with the 28 caliber case, the present 25/20 S. S. case being the outcome of experiments made after his 28 cal. rifle was in use. He was interested in developing a vermin cartridge; one that would give improved accuracy and as high velocity as possible, with the components at hand. To fully understand the situation as it existed some seventy-five years ago, it should be borne in mind that there were no rifles available for small game hunting, with the possible exception of the 32-20-115 case that was used in the 1873 model Winchester. This particular cartridge, while fairly accurate, had a low velocity, with high trajectory, and was not entirely suited to squirrel and woodchuck hunting. So you will note, back in the old days the shooters were always looking for higher velocity, as they are today. And this brings to mind the fact that most improvements in rifles and ammunition during the last 75 years were brought about by this country's WOODCHUCK HUNTERS.

In working out the design for his 28 caliber case, Mr. Rabbeth proceeded as follows: First, in order to avoid the expense of an entirely new case, he selected the longest 32 caliber case then on the market, this being the Frank Wesson 32 center-fire case, which was 1⅝" long. He then had his barrel bored for a bullet the size of the inside of this case, so that he might use a bullet of uniform diameter, and seat it to any depth in the shell. This made the bore approximately .28 caliber. For the benefit of your readers who have never seen any .32 C. F. extra long cases, as used in the Frank Wesson rifle, I will explain that the bullets for this cartridge were really 29 caliber, and had at the base of bullet only a heel of the diameter of the inside of the case, the rest of the bullet being larger. The bullet was held in the case by this heel, the same as in .22 cal. long rifle ammunition in use today; thus the outside of the case being the caliber size of the rifle.

With a charge of 25 grs. of fine black powder back of a bullet of 85 grs. weight, Mr. Rabbeth did good shooting up to 150 yards. I believe the April 1884 issue of THE AMERICAN FIELD showed ten shot 100 yard groups made by him that measure only 1½ inches. This was wonderful accuracy for black powder and cast bullets in those days—nearly on a par with the modern 22 cal. Hornet. There is small wonder that Rabbeth's experiments aroused considerable interest among the small game shooters of those days. His rifle, chambered for this 28 caliber case, was tried out on small game but because of the way the bullet tore up ducks and gray squirrels, he decided that 28 caliber was still too large for his purpose. At this time, in 1884, he ordered from the E. Remington & Sons factory, in Ilion, N. Y., a barrel made up in .25 caliber. This was the FIRST barrel ever made in 25 caliber. Harry Pope did not have a 25 cal. rifle until 1887, as per data found in SPORTING RIFLES and RIFLE SHOOTING by John Caswell (page 218).

Mr. Rabbeth used th easme 1⅝" F. Wesson case in 32 cal., necking it down to 25 caliber, then fire formed it in his rifle, which gave him a design with a slight bottle neck. This is exactly the same 25-20 single shot case as we know it today, some 75 years later, and from the first it gave fine results as a small game cartridge. Loaded with 22 grains of Hazard's #3 ducking powder and a 67 grain bullet, this cartridge made an 86 on the Massachusetts decimal target, or 48 by Creedmoor count, for ten shots OFF-HAND, with Mr. Rabbeth doing the shooting on the Walnut Hill range. In his rest shooting, he very frequently put ten consecutive shots into LESS than 1½ inch at 100 yards.

The 100 yard mid-range trajectory height of this rifle, with 26 inch barrel and shooting the above load, was 1½" at 100 and 9½" at 200 yards. The corresponding trajectory tests for the 32-20-115 Winchester case were 3½" and around 15 inches. These figures were obtained on the same day at the Walnut Hill range by Mr. Rabbeth and Mr. Hinman, by shooting through tissue paper screens placed at intervals of 25 yards over the 200 yard range. All figures were double checked and found to be correct.

The E. Remington & Sons Company not only made up the first 25 cal. barrel, but they also made the bottle neck cases that were used in these rifles. Strange as it might seem to us today, this concern was in no way eager to put the rifle or ammunition on the market. From Rabbeth's letters it would appear that they were simply waiting to see how great a demand would arise for the new rifle before tooling up and going into production. However, the Massachusetts Arms Company of Chicopee Falls, Mass. were making the model 1882 Maynard rifle at this time, and they were quick to see the advantages of the new cartridge, and adapted their rifle for it. When these Maynard rifles came out chambered for the new 25 caliber case, they were received with the same enthusiasm as was the 22 Hornet some fifty years later.

I own one of these old Maynard rifles chambered for the 25/20 case, together with all of the old loading tools molds, etc. It has a pin head front and vernier rear sight. With my pet load of 5 grains Unique and a gas check cast bullet, at one time I fired five shots at fifty yards that went into one hole. This particular target was shown in an ad. by the Hercules Powder Company, page 2 in the March 1936 RIFLEMAN.

In another letter I will give you information on the experimenting of both Rube Harwood and Wm. V. Lowe when they necked this 25/20 case down to 22 caliber. Will also have prints made that will show the several designs, which could be shown with a later article.

Sincerely,

Harve

LETTERS

WANTS HELP:

Dear Mr. Teachout:

Will you please recommend a custom bullet maker who can produce 6.5 m/m bullets in match grade quality? (Provided such a bullet maker exists.)

The reason I'm requesting this information is that my 6.5 m/m wildcat (model 70 Win. action, Canjar trigger, premium grade heavy Douglas barrel, 9" twist, in shortened .300 magnum case), while it has a tendency to be accurate, has never given the accuracy such a heavy rifle should give.

Fifty-seven grains of 4350 or 60 grains of 4831 give me two minutes or more with the 140 grain Sierra bullet. The same charges with the 140 grain Norma bullet give me about one and one half minutes. The Speer 140 grain shoots about the same as the Sierra. Bullets lighter or heavier than 140 grain give even worse results. With 38 grains of 4831 (of all powders) and also 38 through 42 grains of 4320 behind the Norma bullet gives me an occasional one minute group (just barely). However, none of the above gets me any nearer my quest for both much less than a minute of angle accuracy and a high velocity very long range weapon in the same rifle.

Before I replace the barrel I would like to try better bullets. If there is anyone making bench rest quality EU bullets, who can and will make 6.5 m/m bullets in 140 grain weight, and in the same high grade that he makes .22 cal. bench rest bullets, I would very much like to get in contact with him.

Francis B. Current
1216 Fetterman Dr.
Laramie, Wyoming

(Editor's comments: Seems as if Mr. Current has set himself a really challenging goal. If any of you can help him, won't you please do so.)

BACKS UP HARVEY DONALDSON:

Mr. P. H. Teachout:

I have just finished reading the last issue of your very informative little shooting paper and realized again for the hundredth time, that while limited in space it's a real giant in informative content. I very frequently get out my ring binders which contain the back issues and, as carefully as I read each one upon arrival, I always find something which seems entirely new.

I have especially enjoyed the letters from Harvey Donaldson, whose opinions are reminiscent of the controversies which ran continually in the RIFLEMAN and other sporting magazines 20 and more years ago. His issue with respect to necking and altering existing cartridge cases, to me, is entirely proper, and serves to point up poor or careless research by many writers who are currently seeking to become firearms experts.

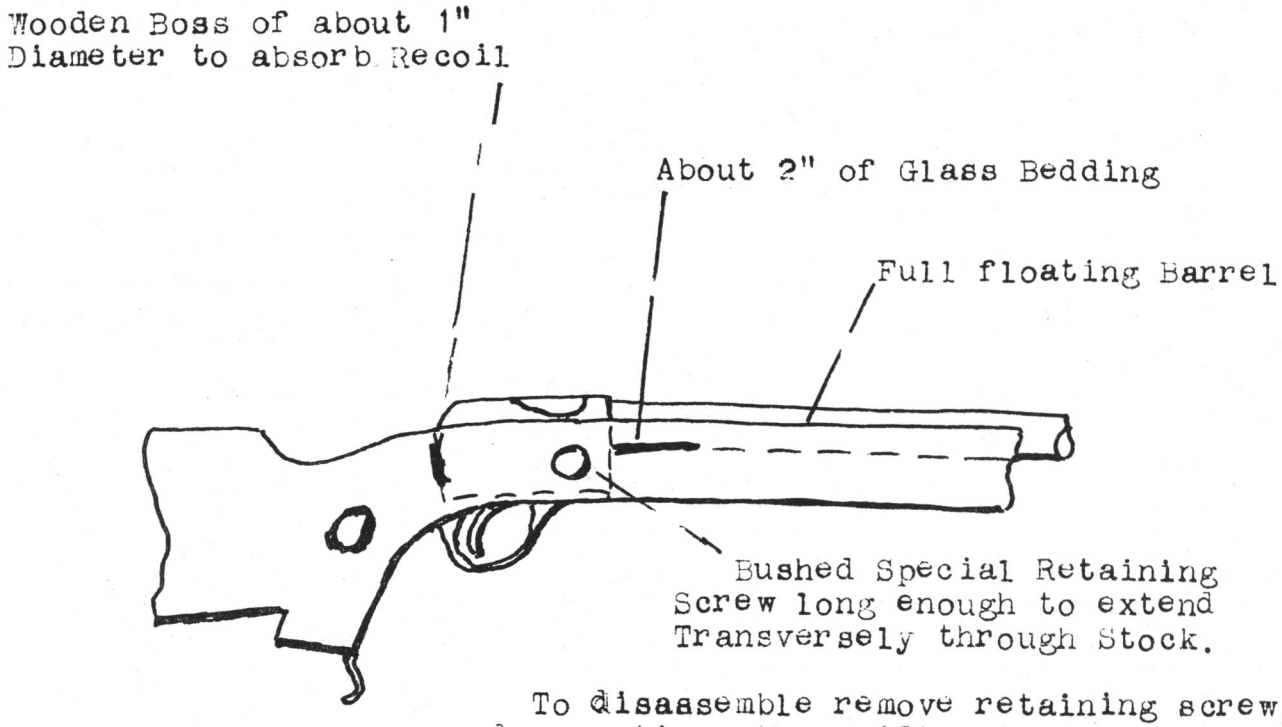
I have copy books of letters written by Wm. V. Lowe which describe his work on case alterations and which are dated 1883-1886. As you probably know, he was noted as a competition rifle shot and became a gunsmith to satisfy his search for more accurate shooting rifles. He mentions his discovery of graphite, or plumbago as he called it, as an ingredient of bullet lubricant. At a later date he wrote several letters warning against its use. He had discovered the fact it was abrasive and had enlarged the diameter of his barrels.

In regard to Donaldson's letter recommending reboring barrels to a larger caliber; Harry Pope recommended reboring or enlarging from .32 to .33 or .34 after shooting for a period as a .32. His theory was that shooting tended to rearrange the molecular or grain structure of the steel. He felt that 500 to 800 firings was sufficient to stabilize the metal.

(Continued on Page Eight)

BSA Action and Barrel

Mounted in a Worked over Winchester Stock Blank


Wooden Boss of about 1"
Diameter to absorb Recoil
About 2" of Glass Bedding
Full floating Barrel
Bushed Special Retaining
Screw long enough to extend
Transversely through Stock.

To disassemble remove retaining screw, drop action, then lift out barrel and frame assembly.

Remarks.-- Apparently the turning moment of the unsupported barrel weight about the fulcrum which is the short glass-bedded section is resisted only by the bushing supported transverse retaining screw, on which the strain must be large, and still larger at time of firing. At the recoil boss, inability to seat may result in course of time, but this fault may be easily remedied with a shim. J. M. Grigg

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Letters

(Continued from Page Seven)

His claim was that opening up the rifle at this point to .33 or .34 improved the accuracy considerably. I am not sure whether he actually made the barrels .33 or used this figure to indicate they had been re-rifled. My Pope measures .345 B. D.

I am sure that Mr. Donaldson's contention is sound, perhaps more so today than in Pope's day. The higher pressures and use of jacketed bullets driven at high velocities would certainly have the effect of stabilizing the steel more quickly, if anything. Although I never tried it, I have argued many times that the idea has merit. After reading the "Old Pro's" letter I am going to put it to test if I can persuade Sam May at Apex to do the work.

I do hope you will encourage Mr. Donaldson to maintain his correspondence, no matter what or how he presents it. His knowledge is something that must be preserved for the benefit of all serious shooters.

Best regards,

G. S. Chamberlain
849 So. Michigan Blvd.
Pasadena, California

GUN EDITOR FIGHTS BACK:

Dear Phil:

As one of these here-now so-called technicull editurs, I read with interest the redoubtable H. Donaldson's notes on urging that our tribe leave off writing for a spell and do a little more shooting. Now this is real commendable advice and I would dearly like to do so, but I wish Mr. Donaldson's own tribe of experienced oldsters WHO ARE ALSO EVEN HALFWAY LITERATE would unbend enough to favor us with some written material of the type which the bigger crop of gun guys want to read today. Highly obscure stuff is of little value in a newstand journal competing for its half buck with a hatfull of other mags, including those under the counter as well as above! So what is written must combine the authoritativeness of Harry Pope, the crispness of Teddy Roosevelt, the vision of Stewart Edward White, the humanness of Archibald Rutledge, the spirit and vitality of Ernest Hemingway, the curtness of Ogden Nash, the humor of F. P. Adams, the sensationalism of W. R. Hearst, the controversy of Drew Pearson, all for a couple hundred bucks, including pix. That's a tall order, no? Trying to get guys in the field who are the repository of valuable information—whether technical or just plain readable gun-stuff—to write about it takes a lot of Ye Eds time. So-called or would-be "gun writers" should take a second and third look at their stuff. This is really why people say "Nobody makes any money in the gun writing game," and I must agree. The man who can combine the above qualities into one essay is tops for the Post or Readers Digest. And that means two-three thousand or more instead of a couple hundred tops. The gun writers who are really good writers, capable of stringing their ideas and facts along in so pleasant a manner that you naturally follow, whether you ever bothered to think of the subject before or not, are mighty few. So, to Harvey Donaldson, I hand the challenge—make it easier on the guys who have to get these "shooting mags" together by thinking of **their needs** in terms of the gun sports **today** (this month, now, not last year or last century) and THEN consider how the wealth of information and experiences they harbor might fit into this current picture and how best to present it in current terms.

(P. S. editor's interruption: That sure is a blast! Thank goodness P. S. isn't com-

peting in the gun "entertainment" field. We think you folks want plain, usable gun dope in P. S. and will look to other books for your literary essays.)

METAL "CURING" THEORY:

As to curing metals: Although I am not a metallurgist I hand out this theory for your metallurgical chaps to consider. Metals are crystalline by nature, composed of a vast number of small particles or crystals, the smallest unit of metals (in size below this, the metal grains may be composed of molecules, linked together by forces which we can disrupt but not undestand). The grains are linked one grain to another by forces along the boundaries where they touch each other. Internally, they are also held together by similar forces. (A fracture may occur when the stress applied is greater than the boundary force, and the metal separates along the crystal boundaries, producing a "crystalline" fracture. Stronger metals have boundary forces more nearly equal to the internal crystal forces. A fracture **across** crystals has a different, less glittering appearance as in, for example, certain steels.)

Now, since the metal piece is a complex of internal forces, each stressing in a variety of directions, it may be that the metal is unstable due to a location of stress in one part more than in another. Grossly, when a barrel heats up that is improperly made, the molecules on one side may become more agitated than in other parts of the tube and cause the tube to bend away from them by themselves "expanding" more at that point. This is a phenomenon of temperatures, but not necessarily high temperatures. A thermostat shows how this differential expansion may exist at temperatures below tempering or fusion.

If anyone has followed this so far, consider then the situation of a newly made bar of steel. It has been subjected to many degrees of temperature at different stages of manufacture. This will produce various stresses internally and create some unbalance. In machining, some parts of the "unbalanced" steel will be lathed off, permitting the remaining crystals to change their stress relationships slightly. Thus a barrel turned and bored with the greatest of care may require some straightening after finishing. Thus, many blanks are "normalized" by a low heating process which is calculated to assist the barrel metal in redistributing its internal stresses in a more uniform manner throughout its length, thus tending to avoid warping.

The curing process of shooting in effect hits the barrel many times with a uniform hammer blow down its entire length, internally, and also expands. This constant flexing in a uniform manner may assist the molecules and the crystals in normalizing their stress patterns. It is known that magnetization can occur by hitting a piece of steel in a magnetic filed. It was thought that the molecules had direction, polarity, and that within the crystals of the metal they actually rearranged themselves to orient their poles in the same direction. Thus the bar of steel expressed this by having a magnetic field of its own—those forces which had previously worked one against the other now failed to cancel out to the same extent and thus permitted development of an external force pattern outside the physical limits of the bar. Carried to its conclusion, this liberation of electromagnetic force within the molecular structure of the bar might, when reduced to separation of electrons in the yet-smaller atom, produce an "atomic explosion." But at different sizes, different things happen. The bar still holds together with its "liberated" electromagnetic energy flowing in a magnetic field, because the liberation of energy is not the boundary forces which hold the gross physical structure of the steel together but rather within the crystal or grain, and this "liberation" is still far less than that which holds the grain together. Studies of fractures have not, so far as I know, included studies of magnets and their breaking points. Anyway, considering the highly energized aspect of the seemingly "inert" slab of metal or barrel blank, it is not surprising to consider that over a period of time these energies may be dissipated or re-aligned, so that when finally carefully finished by processes which neither re-stress the metal nor cause it to become heated, the finished piece remains true and does not suffer further warping from residual stresses. I imagine the surface plate which Mr. Donaldson speaks of as being cured by burying was best cured if buried below the frost line **in a constant temperature zone.** The metal could thus de-kink itself without the added influence of hot and cold days, season change, etc. And, once cured, I assume the face plate was finished by some process a little simpler than that once used in the foundries of England when the first railroad beds were being constructed. No machine tools existed as big as the new machines then being constructed in the shops of Boulton & Watt and others, to handle a locomotive frame. These were cast, but to level them off, they were planed with a device like a plough that was loaded with stones and dragged across the slab of iron by winding it in with a chain on a winch! I imagine as several tons of cobbles jounced across the slab its surface got some pretty stresses imposed, but the overall size was so big apparently it didn't matter.

Cordially yours,
(A gun editor—Illinois)
William B. Edwards

SHOOTING GLASSES ARE INSURANCE

Dear Phil:

After seeing Roy Dunlap's mention of a lost eye due to a blow-up, and after my own experience, I feel that all shooters should look upon the requirement for shooting glasses just as definitely as we accept "bolts-open." I make a point (usually not appreciated) of safety whenever I see an infringement, but accidents are not publicized so usually my sugges tions are forgotten and forgiven as being from an old crank.

Yours,
"Joe" (Louis H.) Davy
San Francisco, Calif.

BARREL "STRESS RELIEVING"

Dear Phil:

I have been a subscriber to Precision Shooting for over a year now and have enjoyed every issue. No other magazine that I know of contains more good solid information for the "Gun Nut."

In the last issue, Harvey Donaldson wrote an article on the re-boring of rifle barrels which was very interesting. Interesting, at least, to those readers who know and understand something about the manufacture of rifle barrels and what makes them shoot. The trouble is, a great many readers of Precision Shooting have little or no knowledge of such things.

Harvey stated that barrels, after being shot for a while, or buried in the back yard for ten years, were "Cured." Cured of what? And what made the barrels shoot better after they were "Cured"?

I think it should be pointed out, for the benefit of those who are interested, that "Curing" is simply a form of stress relieving.

A piece of barrel steel is very apt to be full of stress and strain, and the heat caused from shooting or sunlight can release some of these stresses and actually cause the barrel to bend one way or the other. And when the barrel cools, it returns to its original position. "Curing," or the more appropriate term "Stress Relieving," normalizes these stresses and strains and produces a rifle barrel which will have a uniform point of impact throughout the course of firing.

I wonder if Harvey is aware of the fact that our modern barrel makers, such as Hart and Douglas, have their barrels "Stress Relieved" after the machining operations are finished, and that it is done in modern heat-treating ovens in a matter of hours and not years. I think Harvey will find it hard to prove that any further "Curing" is beneficial to accuracy. He would have one heck of a hard time getting ME to swap my Hart barrel for that one he had buried in his back yard for ten years.

However, I think it should be pointed out that Harvey was probably refering to barrels made in past years which were not "stress relieved" by the manufacturer. These barrels could very possibly be improved by "Curing."

Harvey seemed to over-emphasize the "Curing" aspect, and overlooked the fact that the heart of the rifle barrel is still that "little hole" which goes through the length of it. It's an apparent fact that not all barrel makers are capable of producing precision rifle tubes such as those put out by Hart and Douglas. So,

(Continued on Page Eighteen)

IMPROVE YOUR SCORES
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STINEHOUR RIFLES
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NBRSA MEMBERSHIP DUES:

Individual annual dues $5.00 (includes magazine subscription for membership term). Associate member (wife or husband, son or daughter under 18 years of age, of member in good standing—no magazine) $2.50. Life membership, $75.00. Annual club affiliation fee $10.00.

NATIONAL BENCH REST CHAMPIONSHIPS

VARMINT AND SPORTER CHAMPIONSHIPS at San Angelo, Texas, August 18-19-20, 1960. Contact Mr. F. L. Magoon, Box 909, Kerrville, Texas.

UNRESTRICTED BENCH REST RIFLE CHAMPIONSHIPS at Tulsa, Oklahoma, August 23-24-25, 1960. Contact Mr. E. A. Anderson, 3604 South Toledo, Tulsa, Oklahoma.

1959 BENCH REST SHOOTING RECORDS

In accordance with action taken by the NBRSA Directors at their September 1959 annual meetings to recognize at the end of the 1959 year such new shooting records as were made in 1959, record certificates have been awarded to the following shooters:

A record certificate has been awarded (Mrs.) Barbara Schellert of St. Louis, Missouri, for shooting a five (5) shot group with Heavy Varmint Rifle which is officially measured as .1695 inch. Mrs. Schellert shot this group in a registered shoot conducted by the 9-Ring Sportsman's Club, Florissant, Missouri, on June 14, 1959. This displaces the .2237" by Bruce Pheasant and .2268 by Clarence Deem, former co-holders of this record.

Mrs. Schellert shot the group with a .219 Don in Hart barrel on Win. M70 action in the Win. M70 sotck. The rifle was built by Ted Holmes Gun Shop and total weight was 12½ lbs. She used a Lyman 20X scope. Her load was 26.5 grs. 3031 powder, bullets home made in B&A dies, and Federal primers.

Mrs. Schellert's group is especially noteworthy because it was reported that weather conditions for that match were "rather windy with heavy mirage."

In the Eastern Region Varmint Rifle Championships, fired at Altoona, Pa., on July 12, 1959, Joseph W. Looper of Richmond, Virginia, fired a five (5) shot group at 100 yards with Light Varmint Rifle that has been officially measured as .235 inch. This is the smallest group for this course reported during the season and it has been declared a Light Varmint Class record and a certificate has been awarded to Mr. Looper.

Mr. Looper shot this group with a rifle he built himself—an 18 inch Douglas barrel chambered for the .219 Don. cartridge, on a Mauser action, total weight with Unertl scope being 10 lbs. His load was 29 grs. Ball powder and bullets made in B&A dies.

On July 19, 1959, at the annual midsummer bench rest matches conducted by the Buffalo Outdoor Rifle Club at Buffalo, Wyoming, Clair Hollingsworth from Rapid City, South Dakota, made an aggregate average of .3684 minute of angle for five 10-shot matches at 200 yards with unrestricted Bench Rest Rifle. This has been officially declared a new aggregate record for this course and a certificate has been awarded to Mr. Hollingsworth. The new record displaces the .3851 m.o.a. record made by M/Sgt. Geo. H. Gleason, USAF, (another Rapid City, S. D. shooter) on this same Buffalo, Wyoming range in July 1956.

Mr. Hollingsworth made his own rifle which he describes as follows:

"The barrel was a Johnson P. T. stainless, fitted to a FN solid bottom action. The action was not sleeved and the only alteration was to face the front of the receiver and fit to that shoulder rather than the inner one. I chambered it for what I call the .222 Express, which is the .222 Remington blown out at the shoulder with a 30 degree shoulder, headspaced so that factory ammunition can be fired in it. This reamer was made by Keith Francis and has a long throat or ball seat.

"I used a Fajen rough turned stock of bench rest type. Action was glass bedded and a new screw placed ahead of the trigger. I only used this screw and the front one, leaving the rear tang screw out. The rear tang does not bear but is free from the wood.

"The bullets were made in B&A dies, .2242-6S, Sierra hulls .735" length, weight 58 grains. Powder was Ball "C," 24.5 grains. Charges were thrown with an old Belding and Mull measure. Loading was done on a Lyman Junior press.

"Scope was a Unertl 30 power, 2 inch. Did not use sand bags but the rest could not be called a return-to-battery type. Weight of the rifle is about 21 lbs. with scope."

On July 25, 1959, at a registered shoot conducted by the Windsor Rod and Gun Club on their range at Windsor, Illinois, Harold Cole of Windsor, Ill. shot a ten (10) shot group at 200 yards range which has been officially measured as .3830 **inch** and declared a new record, displacing the .4016 inch record held by Homer Culver, Silver Springs, Md. since June 2, 1956. Mr. Cole has been awarded his record certificate.

Mr. Cole's rifle was built by the Ted Holmes Gun Shop, with a 26 inch Ted Holmes barrel chambered for a .219 cartridge and fitted to a Schultz & Larson action, total weight of rifle with Unertl scope being 26 lbs. He shot Ted Holmes Gun Shop 50 grain bullets with 26 grains 3031 powder.

On August 1, 1959, in a registered match at Reed's Run Rifle Range, Augusta, Ohio, Earl Thompson, Garden City, Michigan, shot an aggregate of five ten (10) shot matches at 100 yards which has been officially measured as .2903 minute of angle and declared a new record for this course. Mr. Thompson has been awarded a record certificate. He displaced the .3105 m.o.a. aggregate made by Al Creighton on this same range on July 20, 1957.

Mr. Thompson shot a Douglas 28 inch barrel chambered for the .219 Don cartridge and fitted to a sleeved FN Mauser action. Total weight with Unertl 24X, 2" scope is 26 lbs. Roger Schmill, Detroit, Mich. did the metal work on the rifle and Mr. Thompson made his own stock. His load was 28 grains Ball powder and his own bullets home made in B&A dies, with Federal primers.

In the Pennsylvania State Bench Rest Championship matches on the Altoona Rifle and Pistol Club's range, August 9, 1959, William B. Kerr from Red Lion, Pa. shot a five (5) shot group at 200 yards with unrestricted Bench Rest Rifle that has been officially measured as .2383 **inch** and declared a new record. Mr. Kerr has been awarded his record certificate. The new record displaces the old record of .2756" which was shot by Harold A. Zeiser on the Wilkes-Barre, Pa. range, August 12, 1956.

Mr. Kerr shot a 30" Hart barrel chambered for the .219 Don. cartridge and fitted to a Mauser action by Pritt, weight with Lyman scope, 18 lbs. Mr. Kerr is a custom bullet maker and shot his own 50 grain bullets with charge of 26 grains 3031 powder.

(Editor's comments: It is refreshing and heartening to note that every one of the six who have either broken existing or established a new NBRSA record in 1959 are shooters who have never before held one of these coveted records. Makes us kinda wonder if the wailing of some people over the "sad plight" of bench rest competition may be because some few of the old-time hot-shots are finding today's competition rather hard to contend with. It seems that at least some competitors, both old-timers and newer converts, are accepting today's challenge with enthusiasm, and forging to the front rank for their hour of glory.)

ANTICIPATE TARGET NEEDS

NBRSA will stock a moderate quantity of official bench rest tournament targets at the headquarters office in Lyndonville, Vt. Clubs needing targets for tournaments should anticipate their needs and order early to assure having the targets on hand when needed.

BEGINNERS CORNER

Robert F. Stinehour
Rt. 9W, M. D. 26
Newburgh, New York

With much pleasure I note the improvement of the rest shooters' average aggregates from 1955 to 1959 in Phil Teachout's statistics of the 1959 Nationals. A 39% improvement for shooters in the .500 to .750 bracket is indeed very impressive and should be encouraging to the new rest shooter, rather than scare him away. It shows that with good equipment, careful concentration on components and shooting, it is not hard to become a good competitive rest shooter.

It's indeed a pleasure to win a match or an aggregate, but it is much more pleasure if the competition is keen and one has to fight down to the last shot. Fighting down to the last shot is another of the things which I feel has improved my own shooting.

Perhaps there are some who still do as I did until the last couple of years. That is, to more or less give up when they get a bad shot or a bad group. The match is never over until that last shot is fired, and anyone is apt to get a bad shot right down to the wire. I've always been amused with Ed McNally's expression; "Every shot pleases someone."

I believe it improves one's **average shooting** to work from the first shot to the last for the aggregate rather than the individual group. Just as good gallery riflemen, when in the offhand position, shoot for the 9 ring rather than the bullet size 10 ring, and hope, and do get many 10's; thus coming up with a better score than trying to get the shot off for a perfect 10, and pulling it out for maybe an 8 or worse.

I don't shoot for that .250" group, and wouldn't get anymore than I do if I did—probably less. By trying to stay within .400" an occasional smaller group will be gotten, and when the figuring is over you won't be far out of the running.

When I get a bad group I tell myself that it is the worst one I'll have, and continue trying down to that last shot. It proves more to be a consistent aggregate shooter, than to shoot those occasional "hot groups."

THE 6.5 M/M FOR HUNTING

It's surprising to me that the 6.5 m/m has not caught on more with hep hunters. There are many excellent cartridges for it and a wide range of bullets (87 gr. to 160 gr.), that make it, in my opinion, the nearest thing to an all-around set-up. I have two in sporters, one 6.5 X 257 and my favorite, the .260 A. A. R. (Monty Kennedy's All Around Rifle). My case has just slightly less taper than the .260 A. A. R.

The 6.5 has excellent sectional density and the long bullets give excellent penetration on game. With a 129 **gr.** Hornady bullet and well under maximum load, I've shot a buck deer head on, in the neck, and retrieved the bullet (still weighing 80 grs.) in the left ham. The same combination will penetrate a green spruce tree over 9 inches in diameter.

Nosler Partition Bullets has just come out with a 125 gr. pill which I believe makes the cartridge capable of tackling any game on our continent.

My .260 has a nine inch twist, and theoretically shouldn't handle the lighter bullets so well, but does fully as well with the 100 gr. and 129 gr. as it does with the 140 gr.

After using one several years and accounting for a good share of game, penetrating heavy cover at times, and killing everything hit, I can say nothing but good for the 6.5 m/m. Accuracy? I've yet to miss my first head shot on a sitting partridge, accounting for six this year alone.

RULE CHANGE OPINIONS

George M. Fullmer

Phil, a good number of shooters write to me as one who is interested in building ACCURATE RIFLES. We have come up with a number of different viewpoints to those that have been published. You will perhaps be interested in hearing some of them.

First, as we see it, there is nothing in the rules that are laid out that prevents a shooter from building a rifle to a SMALLER weight or narrower fore-end than those listed. If the rules were upped in weight so that fellows could use existing factory rifles, most fellows are reasonable enough to go along with it. We do believe it poor judgment to build a rifle so heavy or close to the weight limit that it COULD be ruled out if shot in a heavy rain and weighed afterwards.

A number of us have taken our Varmint rifles and shot them in MATCHES against Bench guns, particularly where conditions, wind, for one, were so bad that we were doing poorly with Open rifles. In our opinion the difference of a **few** pounds was nothing but a mental advantage, particularly when shot in ROUGH conditions. When there is no mirage or wind it is something else again. BUT WHAT MATCH is shot under perfect conditions?

As we see it, the addition of ½ inch to the fore-end could give some complaint IF the fellows had guns made up. However, in a Varmint rifle, if a man could carry one of 13.5 lbs. he certainly could use a 3 inch fore-end with no trouble. Actually the IDEA is to IMPROVE THE AMERICAN RIFLE. If a wide fore-end will show ANY SUPERIORITY over any gun made, we are for it.

IF our association is to be used as an association to IMPROVE THE AMERICAN RIFLE, then we must give the competing shooter rules to work under that will give the rifle he makes up A CLEAR CHANCE TO SHOW ITS SUPERIORITY.

Ernest's St. Louis shooter who claims a bench gun is about as practical as a crossbow is right IF he is contemplating its use on game or as a sniping rifle. However, those of us that have been building them have learned HOW TO BUILD, MAINTAIN AND SHOOT A RIFLE by using those heavy brutes to a far greater extent than we would have if we followed the old MILITARY RIFLE game, for instance. When designing a WILDCAT cartridge we can only tell how good it is, or what alterations will work best, by building it in an UNLIMITED RIFLE—AND THEN SHOOTING UNDER PERFECT CONDITIONS.

All Shooting games have to contend with the fellows who drop out. Ours is at present small, so our losses are more noticeable. As a group, perhaps we have emphasized the MATCH portion of it too much. Basically, as we see it, if the fellows looked at the game as one where they each were to see WHAT THEY COULD GET OUT OF THE RIFLE THEY HAD, we MIGHT prosper more. When a fellow goes to a match and sees the winners with a rifle that costs some $350.00, and he loses with a WW1 Mauser on a $20.00 barrel, one cannot blame him for getting discouraged. HOWEVER, if one of the fellows gets him aside and tells him; "Sure, that's not what Joe is using, but barrel bed that, scrape the stock a little better, take the heavy springs out of the trigger and stone it down a bit. IF after doing this you wish to put a dollar or so in the gun, OK." The article by J. Sweany on improving barrels should put back on the line the fellow who likes to shoot but who dropped out because he could not afford a true MATCH grade barrel.

There will be in ANY competitive sport people who will never come in with the winners. Sometimes they drop out. There will be those that say "I cannot win—Hollidge has a 3.0" fore-end and mine is only 2.5". There are those who take a junk outfit and are happy if they come half-way up the ranking list. There are those who to win will only shoot against fellows who they figure they can beat. The true shooter says "I know quite well I won't win, but the guy who does will have to beat THE BEST I CAN DO." That man will some day surprise himself by having beat the fellows who were above him.

It is quite obvious that it would be impractical to hold an election on what rules to follow. We have had a year to work out a usable ratio of weight and size limits for the fellows to use as a basis for building their match rifles. Therefore it would seem advisable to most of us to FREEZE the rules now so that any guns made in the future could go as close as the customer wants and not be subject to further alteration.

The remark has been made several times that Bench Rest shooting has gone as far as it is going, now. We cannot agree with this as there are too many things that we do not know about today. There is no truth to us that any new records will just be made by the laws of chance. We believe that by concerted effort the average group size of guns shot throughout the country will get smaller. It is not inconceivable that the fellow who shoots the flimsier actions will, with the assistance from other shooters in using different methods of bedding from those now in use, also be able to show increased accuracy, even to such an extent as that gotten by our finest and stiffest actions made today, or better.

There is an entirely new field open to the experimentally inclined shooter in working out a Free Rifle, either in a new case or in developing a case that is now in use.

More work can be done in trying to shoot a greater number of shots before cleaning the barrels. It could be that we will have to group together and go to a different jacket material. The copper alloys in use now are not entirely satisfactory. Basically that is one of the most fascinating things about the bench rest game—EVERY THING WE HAVE OR DEVISE IS ONLY THE BEST UNTIL WE CAN IMPROVE IT!

Our experiments in 6 m/m cases will take us several years to evaluate. All of this time we will have fellows who will be competing with us using a 63 grain or heavier bullet in .224. The shooter who uses a book to choose a cartridge for any given use will always be at least one year or more late in his knowledge. There are many shooters who still are happy with a case designed 50 years ago, and even then Dr. Mann was preaching the concept of cutting down the powder charge and using as small an air space as possible. Examination of barrels used in

(Continued on Page Twelve)

MISSING MATCH PRIZES

Several instances have been reported to us in recent months of competitors who have never received shooting prize awards which have been promised in tournament programs and which they feel they have fulfilled the requirements for winning. Unfortunately all of these instances that have been brought to our attention have occurred in bench rest competitions. Such occurrences seriously harm the bench rest shooting program, hurt the sponsors of the shoots concerned, and tend to undermine the confidence of bench rest competitive shooters.

Some of the instances reported have concerned special trophies listed as awards in shoot programs, others have concerned merchandise awards. All have resulted in from disappointed to quite disgruntled competitors.

What has occurred may perhaps have to be considered as "water over the dam," although in some more recent instances something might yet be done to smooth the feelings of disgruntled competitors. Certainly steps should be taken to prevent such instances occurring in the future.

Regarding trophy awards, there may have been mitigating circumstances in past instances, such as: Donated trophy promised for award for special conditions but never delivered by the person or organization promising the award. Donated trophy supplied for special conditions but with the special conditions not clearly defined, or so complicated that the shoot sponsors gave up in disgust trying to determine the winner. Established rotating trophies to be competed for annually which are not returned by the last winners.

In the case of donated merchandise for prize awards, there have been too many cases in very recent years where a shoot program does not provide for any specific, clearly understood method for awarding this donated merchandise. Such a situation can and frequently does lead to, at the very least, disappointed competitors, and as this merchandise is sometimes distributed, we suspect it may make the donors unhappy as well.

Some of the regrettable past incidents may have been due to inexperience of shoot sponsors in planning and conducting shooting tournaments. Some suggestions might be in order which might serve to prevent similar incidents occurring in the future.

No shoot sponsoring organization should list in its tournament program any prize award which it is not willing to guarantee delivery of. If it offers for award a trophy that is donated, it should either have that trophy in its possession when the shoot program is prepared, or it should be prepared to supply a similar trophy itself if the supposed donor does not deliver. The conditions for winning any award listed in a shoot program should be so clearly outlined in the program that no competitor may misunderstand them, and those conditions should be carried out EXACTLY as outlined in the program.

If a donated trophy or other award is offered, for which the donor sets special conditions for winning the award, the donor should make those special conditions quite clear, in writing, and over his/her signature, and the shoot sponsoring organization should be willing to agree to carry out those conditions, in writing, before accepting the donation. It follows that those conditions for winning the award should be clearly set forth in the shoot program.

A donated trophy or other award for a shoot which is received by the sponsoring organization after the shoot programs are prepared and mailed, may be posted on the shoot bulletin board, with the conditions for competition clearly specified.

Donated merchandise for prize awards can present somewhat of a problem, since some items may be received after programs are printed and mailed, even some of the most valuable items at that. A system which this writer has observed at some matches, and read about, seems to be fair to all, quite workable, and the general conditions for award may be set forth in the program, even though the number and nature of the prizes are unknown when the program is prepared. In this system, the merchandise awards are made in one or more specified matches or aggregates, preferbaly aggregates, and the awarding is by competitor's choice according to his ranking in the match; i. e. the match winner gets first choice of the merchandise items available for award in that match or aggregate, second ranking competitor gets his/her choice of what is left, and so on to the last piece of merchandise awarded in that match (for which the winner hasn't much choice). If the merchandise is to be awarded in more than one event, the total merchandise should be divided into somewhat similar value groups for the specified events and should be displayed at the shoot, each lot being labeled for the event it will be awarded in.

Whether the above or some other system of awarding donated merchandise prizes is followed, the method for awarding and the conditions for winning should be clearly set forth in the shoot program.

If the above simple suggestions are followed we do not believe there need be much complaint by prize donors, shoot sponsors, or the competitors.

Far too many shoot programs we have seen have been entirely too brief and have failed to give sufficient information about the shoot. A GOOD tournament program should tell the prospective competitor EVERYTHING he/she needs to know about the matches and how they will be conducted. If such a program is prepared and adhered to exactly, there should be no reasonable excuse for wrangling during or following any shooting competition.

While the foregoing is pointed specifically at bench rest competitions, we believe the suggestions offered are just as sound for any other type of shooting competitions or tournaments.

PHT

Rule Change Opinions

(Continued from Page Eleven)

matches shot by Military Rifle Shooters will give a Bench Rest Shooter bad dreams for months. These poor people could be given a lot of help by experimentally inclined shooters. When we have time we intend to give them a concerted effort to assist in working out rifles that can be cleaned at the end of a string so that they do not foul as much, and add a considerable part to their potential accuracy. Presently they do not clean during the entire shoot at a match like Camp Perry.

Phil, as we see it, THE BENCH REST GAME, IF GIVEN AN ASSIST BY THE FELLOWS NOW IN IT, IS IN ITS INFANCY. Here in California we have fellows who will be shooting Bench if only for their own knowledge. We will be working on guns if our only tool is a pocket knife. The fellow who quits will always be with us. It is the fellow who will hold out on the house money till he is able to get the barrel for the next rifle that should be figured on—He is the number one man for the Top Twenty NEXT YEAR.

MORE SHOOTING INCENTIVE

With the adoption of a "National Match Course" of fire for both Varmint and Sporter rifle classes by the NBRSA Directors at their annual meeting last Fall, and the policy of recognizing aggregate records made with both Varmint and Sporter class rifles, there should be considerable more incentive for shooting these lighter rifles in registered matches in the future.

In addition to recognizing records for the new National Match Course aggregate (aggregate of five 5-shot matches at 100 yards and five 5-shot matches at 200 yards) for each Heavy Varmint, Light Varmint and Sporter class rifles, records for five 5-shot matches at 100 yards, and five 5-shot matches at 200 yards, for each of the three classes, will also be recognized.

Both five and ten shot group records at each 100 and 200 yards, for each of the three rifle classes will also be recognized. Group records are presently established for 5-shots at each 100 and 200 yards and 10-shots at 100 yards with Heavy Varmint Rifle and for 5-shots at 100 yards with Light Varmint Rifle. All other group records may be established by the end of the 1960 season.

We have not seen spelled out the method for determniing new records to be recognized at the end of the 1960 season (December 31, 1960) but we would presume it may be somewhat as follows: That for registered shoots where one or more of the recognized Varmint and/or Sporter rifles is programmed, the shoot sponsors would retain the targets for the smallest aggregates fired and report the range measurements to either national headquarters or to the chairman of the Judging Committee. At the end of the season the smallest two or three aggregates for each of the recognized aggregate courses could be called in by the Judging Committee for official measuring, and the results of this measuring to determine the records for the 1960 year. Small groups which will be recognized for records, but for which records have not yet been established, might be handled in a similar fashion. Small groups which appear to be smaller than records which are already established would be sent for judging to the Chairman of the Judging Committee for official measuring—the same procedure that has been in use in the past.

With this establishment of National Match Courses of fire for the Varmint and Sporter classes, and with the recognition of the full scale of aggregate and group records, it would seem most desirable for clubs to conduct **registered** shoots for the Varmint and Sporter Rifle tional Match Course aggregate or one of classes, and to program either the Nathe Range (100 or 200 yard) aggregates.

For the individual Varmint or Sporter rifleman there should be a real incentive to compete in registered shoots in 1960. The National Varmint and Sporter Rifle Championship Shoot at San Angelo, Texas, in August will provide a fitting climax to the season's shooting for those who may be able to compete in them.

Finally, both individual riflemen and shoot sponsoring clubs should clearly un-

derstand that in all the classes the rifle and equipment specifications adopted by the NBRSA Directors and which will be published in the 1960 rule books, are for **MAXIMUMS** permitted in the various classes. Riflemen may compete in any class with rifles, scopes and rest which **do not exceed** the maximum specifications for that class, and so long as he complies with the other NBRSA rules for the competition. For example: A rifleman with a rifle chambered for the .257 Roberts cartridge, and using a 20X scope sight, the combined weight of rifle and scope not exceeding 13½ lbs. and rifle stock not exceeding 3 inches in width at any point, would be eligible to enter Heavy Varmint class matches, but his equipment **would not** be eligible for Sporter Rifle class competition because both combined weight and scope power exceed the maximum specifications for Sporter class competition.

Likewise, registered shoot sponsoring clubs may set limitations on rifles and equpiment which are reasonably **BELOW** the maximums permitted by NBRSA rules, for any of the classes, and any class records made with such limited equipment would be recognized, if small enough. They **MAY NOT** permit the use of equipment **EXCEEDING** the maximum specifications published in the NBRSA 1960 rule book for official competition or record recognition.

Only NBRSA affiliated clubs may conduct registered shoots. Moving backers are required for all registered shoots. Application for holding registered shoots must be made to the NBRSA Director for the NBRSA Region in which the club is located.

PHT

Dear Phil:

Sometimes it is the big articles in the Magazine that hold the reader's attention but the item in the January issue that made me do more "after reading thinking" was the ten lines that you put in about Harvey Donaldson's mementos and data. I, too, have had the pleasure of being in that shop on several occasions and for a matter of many hours. One could stay there a week, yes, even a month and not tire of talking to Harve or absorbing all that he might show. There will never be another Harvey Donaldson and there are folks throughout the coun try who would give a tidy sum to have that pleasure that you had recently, and that I have enjoyed in years past. Harve is like the rest of us in that he isn't always right, but even when he is wrong, he is intensely interesting, is truly sincere and has the courage of his convictions.

The documents and keepsakes have often been talked about by the fellows in the bench rest game and some years ago I remember suggestions from both John Collins and Sam Clark along the lines that it would be nice for the Johnstown Club or some other suitable organization to start a miniature SHOOTERS' HALL OF FAME and incorporate in that edifice some of the priceless things that Harvey and others have, so that future generations can enjoy them. With all the silly gun legislation that is being projected each year, perhaps we are headed toward a time when we can only look at photographs of guns or see them in the museums. As Merry Stuhlschuter types this, she says that she hopes the above condition doesn't burst upon us too quickly because I have a few score of hunting, varmint and bench rest rifles that I ought to liquidate.

I hope from the foregoing that the readers do not get the impression that Harvey is about to pass out and the suggestions I have made are as a memorial to him because I think that those of us who know Harve are amazed at his vigor and youthful ideas. I believe I wrote in a recent letter about him traveling around at the Johnstown Shoot in an ultra modern high powered sport car with a bright red upholstery that any teen-ager would cherish. Like many of us who have shot a lot, his hearing is not quite as keen as it used to be, and when he talks, he does it at a tone level he would like to have us assume. Some people misunderstand this and think he does it because he wants to draw attention to what he is saying and consider that since he has to draw so frequently from his early experiences, he is boasting. Perhaps he is **justly** proud of many things he discovered when most of us were young. It is my sincere belief that we should admire and enjoy him for a life time tenure of enthusiasm for the shooting game. Let's be a little more tolerant of people who are endeavoring to keep attuned to developments today even though they are familiar with earlier ones that are a little different. The Pine Tree Rifle Club and Harvey Donaldson mean much to the shooting game, like Sea Girt, Walnut Hill, Camp Perry, Wimbledon and Dewar. Certain facets of our game are brought to mind at the mention of such names.

Sometimes as I read over this magazine or many of the other shooting magazines, I note paragraphs and articles that are repetitious of things that I have frequently heard or read before. I have sort of trained myself to read them over again either becaust they are fundamental or perhaps precautionary statements that would prevent us from becoming lax to hazards to our physical saefty or shooting techniques. The need for this repetition entered my mind recently because I have received numerous letters from various sections of the country,

(Continued on Page Fourteen)

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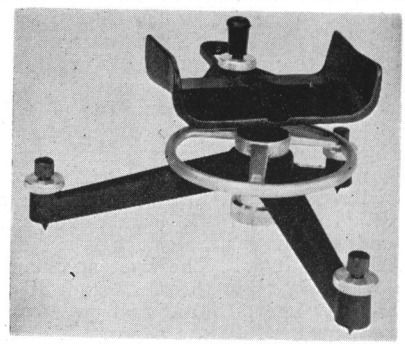

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THIS AND THAT

By A. H. Angerman

BLACK RINGS AROUND BULLET HOLES:

Ever wonder what causes the black ring around the bullet hole in a paper target? A 0.7" long bullet traveling at 3000 feet per second and spinning at around 150,000 RPM will pass through the target paper in just about two one hundred thousandths of a second! Is copper, lead or powder fouling "wiped" off on the paper, or perhaps is the bullet hot enough to scorch it in such an extremely short period of time? To answer this, we took a scissors and carefully cut out the blackened parts of the paper from around the holes in a number of targets. Extremely sensitive chemical tests did not show the presence of lead or copper. Microscopical examination showed that the paper was not scorched. This left "wiping" off of black fouling as a possibility. The chemical tests suggested carbon. But can .014" thick paper "wipe" fouling off a bullet in two one hundred thousandths of a second The answer seems to be yes. We proved that the paper can wipe the bullet, by smearing some of the wife's dark red lipstick on the bullets of some loaded rounds, and firing them from 100 yards. Instead of the usual black rings around the holes we got bright, clean looking red ones! The lipstick clung to the bullet in flight, even though it was rotating at 150,000 RPM and yet some of it got wiped off on the paper. We think the black rings are due to fouling.

PRIMER UNIFORMITY:

"Persnickity" bench shooters weigh their powder charges out to the last pellet. Bullets must be uniform in weight, and the cases are reamed or turned to uniform neck wall thickness, etc., etc. But then we go merrily on our way using primers as they come out of the box. Thought is given to their uniformity, but usually in terms of the relative size of the groups we get at the target when testing several different brands. Frankly, there's little we can do about primers as such. No one hand loads primers! There's no way to select them individually in advance to be sure we'll not get one that's "hot" or one that's "cold" right in the middle of a world shattering group. Maybe the weight of the priming mixture in each primer doesn't vary any more percentage-wise than the variation in our bullet or powder charges. But by how much **do** primers vary in priming mixture weight? We assume here that the primer can be no more uniform in its ignition characteristics than its uniformity in priming mixture weight.

To answer this, we weighed a primer on an analytical balance (an ordinary powder scale isn't sensitive enough). The primer was then fired in a rifle (no powder or bullet), the black residue cleaned off the anvil and out of the cup, and the spent primer reweighed. The difference in weight was, of course, the weight of the priming mixture and the little foil. This procedure was then repeated ten to twenty times for each of five different popular brands of small rifle primers. Without identifying the brands, here are the results:

Primer Brand	Weight of Priming Mixture (Gram)* Average	Maximum	Minimum	Spread	% Variation
A	.022	.024	.021	.003	14
B	.024	.026	.022	.004	17
C	.024	.027	.023	.004	17
D	.025	.025	.024	.001	4
E	.029	.031	.027	.004	14
Different Lot A	.023	.024	.022	.002	9
Recheck of D	.025	.025	.024	.001	4

*weight includes small foil under anvil.

Point to be made here is that primers, at least by these tests, aren't as uniform with respect to their weight of priming mixture as are our powder charges and bullet weights. It is doubtful if we'd allow our 52 grain bullets to differ by 14% to 17%, i. e. by 7 to 9 grains, or a 21 grain charge of 4198 to vary by 3 to 4 grains. Maybe a variation of this magnitude in primer mixture weight does not cause a corresponding variation in ignition characteristics. Perhaps someone else more familiar with internal ballistics can fill us in here.

WEIGHING POWDER CHARGES:

Some bench rest shooters throw underweight powder charges from a measure into the pan of the balance, then bring the charge up to the exact weight desired using a **Little Dripper.** One can get improved sensitivity from the Dripper by threading the end of a 1½ to 2 inch length of ¼" O. D. tubing, using a ¼" x 28 NF die, and screwing this into the already threaded end of the aluminum Dripper spout tube. Powder pellets truly come out one, or at most, two at a time.

20 SHOT MATCHES—200 YARDS:

I understand that in 1906 a fellow by the name of Rowland fired a twenty-shot group at 200 yards which measured 0.776". Now, no record ought to stand for 54 years without being broken officially. Pretty soon someone will get the horribly mistaken notion that we modern bench gun nuts are afraid to tackle it. I think it would be fun this coming season if some of the clubs would schedule one special 20-shot, 200 yard match on their program with a 20-minute time limit. Special matches of this type would be known as "Rowland" matches until his group is beaten. Then suppose Crawf Hollidge stepped up to the bench with that hot gas pipe of his and shot a 20-shot group measuring 0.676". Special 20-shot 200-yard matches scheduled thereafter would be known as "Crawf Hollidge" matches until his group is beaten, and so on. The NBRSA as such would not necessarily have to become involved in officially judging possible record groups if it did not want to; the whole businses could be kept informal and we'd accept the reported Sweany rule measurement of the club sponsoring the shoot.

WIND DRIFT: We recently dusted off our college calculus textbook, and using published velocity data and the usual wind drift formula, came up with the following figures comparing the standard .222, the .222 Magnum, and various 6 m/m bullet weights:

WIND DRIFT—100 YARDS

MPH Wind 3 or 9 o'clock	Std. .222	.222 Magnum	6 m/m 75 gr.	6/m 100 gr.
5	0.9"	0.8"	0.5"	0.4"
10	1.8	1.6	1.1	0.7
15	2.6	2.4	1.6	1.1

WIND DRIFT—200 YARDS

5	3.8"	3.3"	2.4"	1.6"
10	7.6	6.7	4.8	3.2
15	11.4	10.0	7.1	4.7

No further comments on these figures; take them or leave them as you choose! I had no velocity data at different ranges for the .219 Don., so couldn't calculate drifts for this caliber. I'd guess, however, that they would be close to the .222 Magnum.

THE ULTIMATE IN PRECISION OUTDOORS:

Most of us will agree that the attainment of a series of perfect (zero inch) five or ten shot groups, though possible, would be extremely improbable. There are too many variables all of which do not remain absolutely constant at the same time, and long enough. The chances for constantcy of variables for five shots is, of course, greater than for ten, and therefore five shot groups are usually always smaller. But what ultimate, practical MOA aggregates can we expect? We're talking aggregates, not the occasional single-group "freaks" that are bound to occur statistically every now and then.

Let's assume that we have a perfect rifle, perfect rests, a perfect hold, perfect bullets and no mirage. **(Egad, what a situation!)** Let's further assume that vertical dispersion is then due to variation in velocity and horizontal dispersion is due to wind. Ralph Pride (Precision Shooting, Nov. 1956, page 5) showed that the .219 Don. changes impact by nearly 0.20" at 100 yards for each change of 100 feet per second of velocity. I checked this out at 100 yards for the standard .222 Rem. last year and got 0.18" change in impact per 100 fps, confirming Ralph's figure on the nose. Now if we assume that we can eventually learn how to make up loads varying by as little as 15 fps (total difference between fastest and slowest) the total vertical dispersion will be about .030".

The eye can detect a two to three MPH wind easily (grass and leaves flutter a little, smoke drifts slightly from vertical etc). It is doubtful, however, if we can always detect a change in wind velocity of only 0.5 MPH or less by eye or feel. A 3000 fps bullet weighing 50 gr., for example, will be deflected horizontally by .081" in a steady 0.5 MPH wind from 3 or 9 o'clcok. Therefore, loads that vary by only 15 fsp in velocity and are fired through an undetectable 0.5 MPH crosswind changeup, can give no smaller 100 yard groups than .082" if all else is perfect. Outdoor conditions, though occasionally excellent, are never perfect, and so I think it'll be a long time before we'll see 5-shot, much less 10-shot **aggregates** running less than 0.1 MOA at 100 yards or 0.13 MOA at 200 yards. With the inevitable variations in barrel, bullet, bedding, powder, primer and scope errors added, these figures will be higher. I'll stick my neck way out and say we'll pretty much have had it when somebody gets a National Match Course Aggregate down to 0.15 to 0.20 MOA. I'd love to be invited to someone's 100 or 200 yard indoor range sometime to determine what can be done with the weather eliminated.

Stool Shootin Stuff

(Continued from Page Thirteen)

written by fellows who are interested in the precision game, but feel that we frequently in the magazine "talk over their head." What seems to us to be a "beginners corner" is sometimes to these chaps advanced stuff, and so they find themselves in a midst of a controversy that is a little over their heads. I am not very often stymied by the complication of the questions I get, but I am frequently staggered by the numbers of them, which indicates to me that we who answer these letters must always be tolerant and generous in the suggestions we make. We who live adjacent to other shooters with like interest and equipment, or those of us who travel to

shoots where there is a good congregation of shooters, must not lose sight of the fact that throughout this country there are thousands of shooters who would like to have our advantages and for reasons beyond their control, do not. I often give these writers the name of shooters not too far from them if any are available, or tell them of the nearest shoots they might attend, along with other sugegstions I make to them to help them out of their difficulties, or answer to the best of my ability some of their questions. There are no fixed answers to some that I can be positive about; for instance, questions such as tight barrel bedding vs free floating; the relative merits of the .219 vs the .222 or the .222 Magnum; the Winchester .243 vs the Remington .244; whether to hold the rifle tight or loose; the merits of the cross hair reticule vs the Lee dot or what power is best in telescopes. These are all difficult questions to take a positive stand on as it depends so much upon the shooter, his equipment and the conditions under which he shoots. These are things that are worked out by their own experiences and experiments, and preferences. Results of the matches and a review of the line of shooters will clearly indicate that matches are being won with a wide variety of equipment, and the pertinent and very simple facts are that they are being won because the shooter is thoroughly familiar with his equipment and automatically adopts the technique that makes it perform to such a high degree of satisfaction. I am not a one gun man but I agree that such a guy can very possibly have a big advantage over me if he has lived with that one gun, taking out the bugs and discovering its idiosyncrasies, and perfecting his shooting technique with that gun. I enjoy the letters as they come in and am glad if I can help the writer with my answers. There does seem to be mountains of this correspondence and I am sometimes late in getting the answers back, and by that time he has a whole new set of questions and so the circuit starts over again, but I guess I am but following in the footsteps of many others who love the shooting game, and thus develop a lot of correspondence.

At some stage in my earlier life, I should have taken up typing, because as things stand now, I am driving along a high speed expressway skirting the shores of Massachusetts Bay while Merrie Stuhlschuter takes this down in shorthand so that she can transcribe it tomorrow when we return from Boston.

Many of the letters are about bullet making and it is clear to see that the boys are forgetting some of the important points and are not sufficiently close to their tools to know how to adjust them satisfactorily. Through long experience, I have found that it is next to impossible to satisfactorily set up the dies and tools to make identical bullets from one jacket lot to the next without minor changes. About the best thing one can do, if he is making a lot of bullets, is to buy jackets in large quantities, of the same lot (after assuring yourself that that lot is a good one by careful measuring and testing) and then, if you have the tools and space available, either set up all dies to be used with one tool or make sure that the separate tools, as they are set up, are segregated for core forming, core seating, or final swaging. The slight variation in jacket weights will cause one to reset his die slightly if he is to come out with an exact weight of a bullet to match a previous lot (the writer feels that slight variations of 1/10 to 2/10 grain weight from lot to lot of bullets has little or no effect on the performance of the rifle and does not have to be compensated for by altering sight settings or powder loads).

A core seating die may have to be adjusted from lot to lot of jackets because of the dimensional variations in wall thickness and interior base shape of the jacket. This will require a separate punch in some instances because it is rather important to avoid as much as possible bleed-by on the punch end, and expand the jacket with the seated core to almost the exact size that you wish to obtain in the final bullet. That is why matching core seaters and bullet dies should be carefully cared for, and normally used as a pair.

Many people do not adjust their swaging dies correctly, and as a result they have bullets with unsatisfatcory ogives, points and bases. Look over your operation and make sure that your finished bullets come out longer than your jackets. This is a very interesting development that many people do not note, and is created because the moving lead core, as it changes shape from a nearly cylindrical one to the ogive shape, affects a stretching action on the jacket as the friction between the core and jacket stretches the jacket upward in to the die. The effect is more noticeable when the oxidizing system of the cores is used. The bullets from cores so treated will be longer than those from which merely a de-greasing process was used. When the die is properly adjusted at the bullet swaging stage, a comparatively small amount of physical effort is required to swage the bullets. The point should not flare up into the ejection pin opening, and the base should not be too sharp cornered. There will be visible ogive creases, but not too deep if lubricant is used sparingly. Harder jackets make more obvious creases but it is believed that they shoot better, also—not because of the creases but because the jacket material offers a lower frictional coefficient.

Phil, before the next letter gets to you, I will or will not have gone to Elmire (N. Y.) Last year, I decided the treacherous driving conditions were too hazardous, but as the time draws nearer, my yen to go increases. The accomplishments or lack of same at the meeting are not the drawing card. It is seeing the chaps we shoot with throughout the summer that really counts. There will be those among them that don't see eye-to-eye with me, but most of them I am very fond of and always enjoy being in their company. Whenever we get together again, I experience the feeling that the lyric writer felt when he wrote "HAPPY DAYS ARE HERE AGAIN."

Cordially yours,
Ernest Stuhlschuter

IRON SIGHTS AND "BUY AMERICAN?"

Dear Phil:

Just a short letter to express my appreciation of the fine writing of Jesse M. Grigg, who has done many such good articles as the current one on iron sight aiming. We are fortunate in having someone of his ability to discuss such matters for the benefit of our coming International shooters and this is especially so in the field of iron sight shooting, which has been neglected so often in favor of the 'scope—a neglect which has been reflected in our slow progress in the International field.

Personally, I have shot iron sights in gallery competition for a year and a half now. In league and other registered competition I am averaging 384.1, which is not too bad for a 48-year old hasbeen. I enjoy it much more than scope shooting. I am not about to win any awards of any consequence—I have a 13-year old that will do that—but I enjoy my shooting more and that is what counts. As a matter of fact, it is a lot easier on the nerves than in the case of a 20 power scope, which moves enough to give me the Willies anyhow. Another thing—I have 54 juniors who, when they are getting chewed out by me for some neglect of iron sight fundamentals, sometimes wonder if the old man can do what he teaches, and I have to be able to do it WITH IRON SIGHTS. I have adapted, of course. Bought a fine knobloch glass from Dunlap, use a blinder, choose my inserts very carefully, and once in a while go 100-10X, and that ain't easy with Xpert.

(Continued on Page Sixteen)

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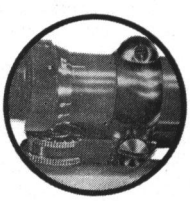

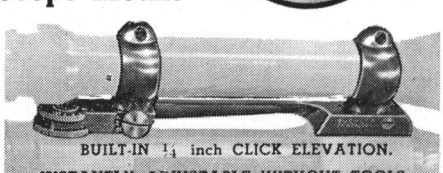

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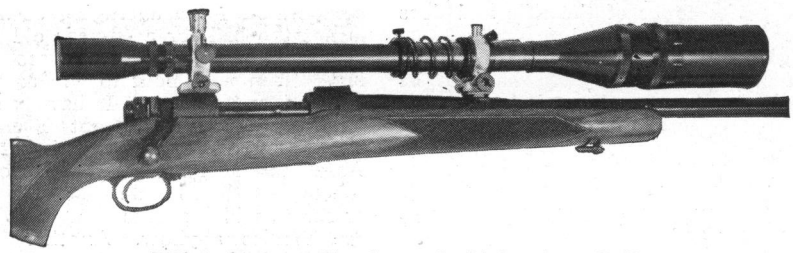

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ARE FEATHERWEIGHT RIFLES "LOAD-SENSITIVE"?

While experimenting with approximate full charge loads in my .308 Win. caliber, Savage model 110 MCL featherweight rifle prior to last Fall's deer hunting season, I found this light rifle with free floating barrel to be apparently sensitive to relatively minor changes in powder charges and types, when using the same bullet weight and type. This was not unexpected and since each load seemed to hold its point of impact quite consistently for the comparatively limited shooting with each load, it was not disturbing. I settled on a deer hunting load of 44 grains 3031 powder behind my home-made soft-swaged 145 grain bullets in Western Super-X cases with C. C. I. primers. The rifle was sighted to center the group at point of aim at 100 yards.

Early in December, following deer sesaon, I put together some of the mildest loads I had tried in this .308 rifle:—36 grains Hi-Vel 2 powder behind my home-swaged 145 grain hollow-point bullets, and the C. C. I. primers. Sixty of these loads were put in new Norma cases, ten in some F. A. cases and ten in some Remington cases, these latter twenty cases having been fired many times. These loads were fired on a sunny day with temperature at an average 32 degrees and some variable wind, with the range snow-covered. Firing was at 100 yards from bench rest.

I started shooting with the Bear Cub 4X scope as it had been sighted for my deer hunting loads. I quite expected a considerably lower point of impact with these light loads but was somewhat surprised when the first bullets printed a full 16 inches below point of aim with the hunting load sight setting.

Once the sight was adjusted to bring center of impact approximately to point of aim, this light rifle held its point of impact very consistently for the following 75 shots, taking minor sight corrections at full value, and no more. The rifle barrel did not become fully cool at any time after firing was started. Groups did not tend to spread noticeably as shooting progressed with a constantly warm to hot barrel.

The 60 rounds in Norma cases were fired in 10 shot strings. The accuracy of this light load was not at all outstanding. Average for the six 10-shot groups at 100 yards was 2.16 inch, this including one group with one wide shot at 10 o'clock and another wide one at 2 o'clock to make an extreme spread of 3.14 inches while the balance of the shots in that group were centered with a 1.28" spread.

I reported this shooting to Creighton Audette, suggesting the possibility that these featherweight rifles might be more sensitive to powder charge variations than might be the case of considerable change in bullet type and even weight, using the same powder charge for all. Some two weeks later he wrote that he had done some tests with his Win. M70 featherweight in .308 cal., using several different bullets, but using the same powder charge for all. We quote the following from his letter:

"Your letter of the 13th concerning points of impact of different loads in your .308. The only explanation that I can offer is barrel whip and possibly vibration, if we do really get vibration in a gun barrel. I ran some tests in my own .308 which might be of interest to you. All shooting was at 200 yards and all loads were identical except for the bullets used. Load was 46.5 grs. Western ball powder and Winchester 120 primers. My regular deer load is this with the 150 grain Nosler bullet. With the ball powder that I have this seems to just about equal the factory load. The gun was sighted in carefully to hit the point of aim with the Nosler bullet.

"150 grain Sierra hits about 1 in high. 150 grain Hornady Spire Point hits about 3 inches low. 150 grain Hornady Round Nose hits about 4¾ inches low and 2 inches right. **125 grain Sierra hits about 1 inch low.**

"I shot two groups with the 150 grain Sierra and rechecked the point of impact of the Noslers after the other groups were fired to make sure that the tests were accurate. Although all groups from absolute, the accuracy of all loads were five shot, and so this test is far seemed to be about the same. The group with the 125 grain Sierra bullets was very good and now I want to try a few more groups with this and see what the results are."

The weather here in northern Vermont hasn't been fit to do any outdoor test shooting since that day in early December, and probably won't be until sometime in April. I presume the same situation will be true for Audette, who is less than a hundred miles south from me, but we may both have something further to report on this "load-sensitivity" of featherweight rifles after shooting weather is with us again, come Spring. I have the same cases used in the December test filled with the same loads (except some with a different primer) and some of my 1959 hunting loads ready for "check loads." I also have other cases loaded with the same powder charge and primers, but with different bullets of various types and weights. I plan to later follow up with more testing to try to gain further information on the "load sensitivity" characteristics of these featherweight rifles with **free floating barrels.**

In the meantime, if any of you have recorded data of tests that supply information on this "load sensitivyti" of various featherweight rifles, it would be helpful to many of us if you would send it along for publication.

Another characteristic of the featherweights that we would like more information about is their ability or inability to maintain consistent point of impact from beginning cold barrel to hot barrel in group shooting. PHT

Iron Sights

(Continued from Page Fifteen)

Another thing, while I'm off the subject. Up until this fall, I was imbued with the proposition that a fellow ought to buy American. So I did. A Remington 40X $129) plus Canjar trigger ($22.50), plus Dunlap stock and other essentials ($95), plus Redfield International sights ($38.50) and I was "in business." About $285 or thereabouts, and it still was a cobbled-up rifle. I got wise this fall and bought a Finnish Lion—all set to go, with my International sights, which I kept. $156.00 for the rifle. I am very pleased and the rifle **shoots.** When will our domestic manufacturers learn?

The 40X is a good idea. It eliminates much of the junk Winchester stlil continues in their 52, but it still has a long way to go. Why can't Remington option their 40X—sell and assembled action, with or without trigger, or a barreled action, same, plus optional prone or oversize unfinished free rifle stocking? If Remington really wanted to do something in International shooting, they would make it possible for the average shooter to get what he wants. Some French outfit is doing that right now with a shotgun. But when I accompanied my order for replacement parts for the 40X last summer with some suggestions, I got the whole shebang right back, clearly indicating that the Remington policy is to give the public what they wanted, not what the public wanted. General Motors and the others got quite a shock when people had a chance to buy what they wanted in foreign cars, and in the instant case, Remington may learn the same thing. I hope so.

This ridiculous myth of American predominance in everything was bound to come a cropper when we had to put certain of our products up against foreign competition. When my kids get old enough, I will take another look at the field and unless domestic firms have

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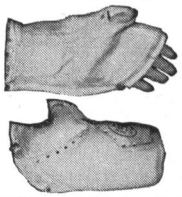

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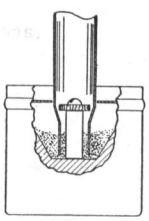

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smartened up in the meantime, I will buy each of them an Anschutz or a Lion. Maybe this is what happens when a cartel takes over the manufacture of an item which should be made in conformity with demand and not the other way around. Certainly it is an interesting policy when suggestion, made by a shooter aren't forwarded to the head office for consideration. Frankly, I don't know whether I want a rifle made by someone who isn't interested in making the best rifle he can make.

Certainly we are ahead in a lot of things—Dunlap's equipment — Douglas barrels—but all of these don't help much if the basic piece is not well designed and well produced. The only way I can fight back is to refuse to buy American products until they will produce something as good as I can buy cheaper abroad. If others did the same, it might make our own people get on the ball.

Thanks for the opportunity for me to exercise a little mental catharsis. Needless to say, I enjoy a magazine which gives the competitive shooter something to read and benefit from.

Rod Manson,
Watertown, South Dakota

THE TOURNAMENT CIRCUIT METROPOLITAN 100 YARD SMALLBORE

Two matches—two wins; that's Barbara Norton's score to date in the present season's Metropolitan Rifle League matches, fired at 100 yards in Brooklyn, New York, December 13th. Mrs. Norton, from Bridgeport, Conn., beat the field of 55 in the individual 40 shot match with a score of 400-35x. She and husband Lloyd took runner-up spot in the two-man team match with a possible 800-54, and Mrs. Norton ranked third in the two-match aggregate with 800-65, being ranked by Loren Samsel (Penna) with another 800-65 and the winner, Walter Tomsen, with 800-67.

Sam Tekulsky was runner-up in the individual match with 400-34. Kermit Montross (Hartford, Conn.) and Loren Samsel took second and third spots, each with a 400-33 score. Rans Triggs was fifth with 400-32 and Walter Tomsen sixth with 400-31. R. Arrington was high Expert with 400-29 and Joe Waltzer second with 400-28. A total of 15 fired possible 400 scores in this match.

Roy Oster and H. Swarts, Jr. (Penna) won the two-man team match with 800-57. Irwin and Sam Tekulsky outranked Walter Tomsen and Harry Stone for third spot, both teams with scores of 799-63x.

Eight made aggregate possible 800 scores. Rans Triggs was in fourth spot with 62x's, H. Swartz, Jr. had 59x, Joe Waltzer (Exp) 57x, Fred Triggs 55x and Lloyd Norton 47x.

NEW JERSEY SMALLBORE LEAGUE

Madison Rifle Club won the 1959 Union County Rifle League championship (outdoor smallbore) with 13 matches won and 1 lost. Perth Amboy ranked Maplewood by a very slim margin to take runner-up spot, both teams winning 10 and losing 4 matches. Eight teams competed in the league schedule. Madison fired four possible team scores of 1000, and Perth Amboy fired one possible.

Madison shooters took the three high average spots; Rans Triggs with average of 199.77 per match, Fred Triggs 199.57 and J. Kolbus 199.31. Perth Amboy had the next three high averages; C. Walter 199.28, L. Larson 199.27 and S. M. Federoff 199.25.

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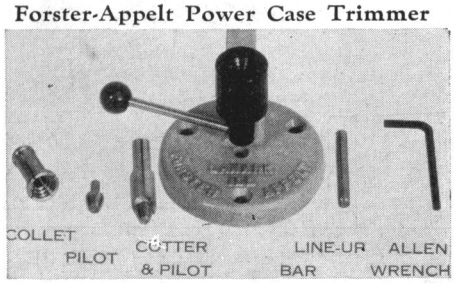

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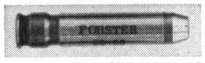

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Letters

(Continued from Page Nine)

no matter how well "Cured" the barrel is, its accuracy still depends on the precision with which it is bored and rifled.

As I said at the start, I enjoy Precision Shooting very much, and have acquired much valuable information from it. I hope this letter will help others better understand a little of what makes a rifle barrel shoot accurately.

Sincerely,
Edward M. Shilen
R. D. 1, Dryden, N. Y.

CARTRIDGE CASE CAPACITY VARIATION

Dear Phil:

I see by the Nov. '59 P. S., page 14 and also in the Dec. issue that you have been having yourself a time with case capacity among other things. It surprises me to find so many otherwise careful reloaders who either totally ignore the possibility that the capacity of cases (in same caliber) may vary widely or fondly believe that if they stick to one make or one lot that they will secure uniform velocity.

Full length sizing and filling carefully with ball powder or a liquid gives quite reliable means of measuring relative capacity if the "Filling" is weighed (in the case of liquid it can also be measured for volume). Even this is open to some errors, however.

There is a much simpler way to find the relative capacities of shells of the same caliber. It is natural that I should prefer this other system, having spent a great deal of time if not effort in avoiding work. Now please bear in mind that the following "Statements" are open to small errors and variations. Cartridge brass (the material itself) is practically the same for all makers and therefore can be taken as having the same specific gravity. Daimeters of the head ends (the non-expanding portion of the shells) do not vary greatly. Also extractor grooves do not vary to any great extent. Between the base of the bullet and bolt face the chamber is filled with brass and space for powder gasses (any space on the outside of a new or full length sized shell won't remain long after full pressure is reached within the shell). Primers (large size) can be taken as weighing 5 grains regardless if new or fired (difference is about 0.7 grains). The "Meat" of the above is simply weigh the shell with primer in it—if not primed add 5 gr. or drop a primer on the scale pan (but don't forget it is there when you put on a prime done). Take 10 grains of brass as having the same **volume** as 1 grain of average powder. This weighing system allows a fast and surprisingly accurate means of sorting shells regardless of them being nice new ones or scrounged ones (always well to look in the latter, or any shells for that matter—mud, beetles, etc. also have weight and take up space).

At one time I got 65 shells, some loaded, of what I believed to be the same lot of .30-06 **match** ammo. The primed shells varied **over** 30 grains. The lightest held over 3 grains more 4350 powder than the heaviest, after all shells were well formed to the same chamber. Other things being equal, we wouldn't expect to get the same velocity and pressure if same load were put in .30-06 and .308 shells. So why ignore capacity till after several firings a flier or so is noticed. It is hard to understand the lack of regard for capacity variations by otherwise particular loaders.

Just how much effect does capacity variation have? I can't answer that in regard to any of the "Accurate" cartridges but here are the results of a small test I had run a few years ago. After much selection and a couple of days work I came up with a few shells in .30-06 caliber that were quite close to being the same in all respects except half weighed 200 grains and half 180 grains, within **a** grain or so. Same outside size, neck thickness, and wall thickness at that point where the piston of the pressure gun would bear. The interior walls had the original surface if not the original shape (and volume). Shells were loaded with a moderate pressure load of 4064 powder and 180 grain bullets. The individual velocities in each group were surprisingly uniform. The 200 grain shells gave an average 42 fps greater velocity and 1400 lbs. per square inch greater pressure than the 180 grain shells. The velocity difference being about 1.6% of total velocity. Other brief tests conducted at the same time indicated that 0.7 grains of the powder would produce the same 42 fps velocity change within the loading range we were working. Greater density of loading, loading to greater pressures and use of light bullets will, I believe, tend to accentuate the affect of capacity, or powder weight, changes. The latter is just this tinkerer's opinion.

Sincerely,
Bob Snowball
Montreal, P. Q.

(Editor's comment: A point which might be overlooked in casually reading the report of Bob Snowball's test (last paragraph of his letter) is that while the **capacity** difference between the two lots of cases was approximately equal to the **volume space** that would be occupied by 2.0 grains of powder, yet, the burning of an additional **0.7** grains to the powder charge balanced the velocity difference. The "moderate" powder charge reported being used in the test undoubtedly left a considerable part of the capacity volume of the case unfilled with powder (a considerable "air space"—or low density loading). Bob's test was apparently concerned with the "accuracy" affect of differences in case capacity. Looked at from the "Safe Loading Practices" angle, the report would seem to indicate quite clearly that had a near maximum powder

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SELL accurate thirteen-pound Springfield .22-250, Rothschild Claro stock, Wallack chambered Douglas 26 inch heavy barrel, Buehler base, $95.00. Charles Gardiner, 39-30 220th Street, Bayside, New York.

charge been used in the 180 grain cases, that same charge would have been an over-load in the 200 grain cases, and quite possibly a dangerous over-charge. Such a condition should be obvious by visual inspection, as was the case in the report I made on case capacity variations in the November 1959 issue (page 15-16). However, such a variation in a mixed lot of cases being reloaded might go unnoticed by a careless handloader. This emphasizes the real need to visually inspect all powder charged cases before seating the bullets, as a simple safety precaution.)

CALIFORNIA HI-POWER MATCH

The first Valley Shooting League .30 caliber match in 1960 was fired January 3rd on the Fresno Rifle Club range with 45 competing.

Wilbur Goolkasian, Fresno, totaled a 247-25V score to win the five match at 200 and 300 yards aggregate. John Harness, Selma, scored 244-31V; Henry Wright, Fresno, 242-26V; and Wm. Agee, Avenal, 242-16V.

Goolkasian won the 200 yd. standing stage with a 50-7v tally; Henry Wright the 200 yd. rapid fire with 50-8V; Bob Perkins, Fresno, the 300 yd. rapid fire with 50-6V; John Kennett the 300 yd. prone slow fire with 50-9V; and Clarence Kozlowski the 300 yd. sitting slow fire with 50-6V.

COMING IN: An informative article on telescope sights by Robert Sears which should be of interest and of help to many riflemen.

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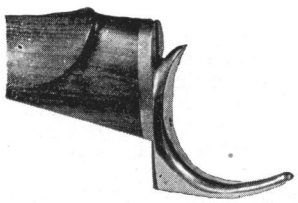

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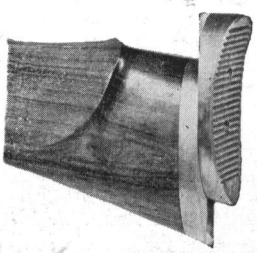

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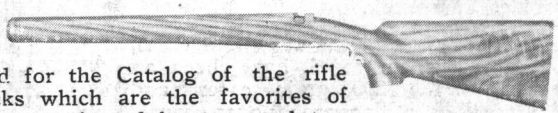

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